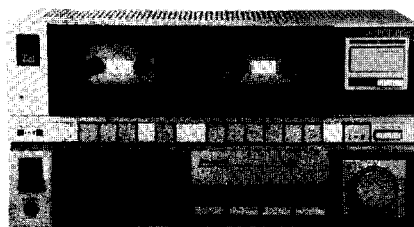


 **PIONEER®**

Service Manual

**CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS**



**ORDER NO.
ARP-712-0**

STEREO DOUBLE CASSETTE TAPE DECK AMPLIFIER

DC-X21Z

DC-X20Z

(Silver Version of DC-X21Z)

- DC-X21Z is the same as the DC-X20Z except for the design (color) only.
- Models DC-X21Z and DC-X20Z come in versions distinguished as follows:

Type	Applicable model		Power requirement	Destination
	DC-X21Z	DC-X20Z		
HE	○	○	AC220V (240V)*	European continent
HB	○	○	AC240V (220V)*	United Kingdom
YP	○	—	AC240V (220V)*	Australia
HEZ	○	—	AC220V (240V)*	West Germany
KU	○	—	AC120V only	U.S.A
KC	○	—	AC120V only	Canada
S	○	○	AC110V/120V/220V/240V (switchable)	General market

*Change the primary wiring of the power transformer.

- This service manual is applicable to the HE and HB types.
- As to the KU, S and YP types, please refer to the additional service manual (ARP-713-0).
- As to the HEZ type, please refer to the additional service manual (ARP-714-0).
- As to the KC type, please refer to the additional service manual (ARP-715-0).
- Ce manuel d'instruction se réfère au mode de réglage, en français.
- Este manual de servicio trata del método ajuste escrito español.

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1. SPECIFICATIONS

AMPLIFIER SECTION

Continuous Average Power Output is 40 Watts* per channel, min., at 8 ohms from 40 Hertz to 20,000 Hertz, with no more than 0.3% total harmonic distortion.

**Measured pursuant to the Federal Trade Commission's Trade Regulation rules on Power Output Claims for Amplifiers.*

Continuous Power Output	
40 to 20,000Hz	40 W + 40 W (T.H.D. 0.3% 8 ohms)
1 kHz (DIN)	50 W + 50 W (T.H.D. 1% 8 ohms)
1 kHz (DIN music power)	70 W + 70 W (T.H.D. 1% 8 ohms)
Hum and Noise (IHF, short-circuited, A network)	
PHONO	72 dB
Hum and Noise (DIN continuous Power/50 mV)	
PHONO	68 dB/60 dB
Total Harmonic Distortion (40 Hz to 20,000 Hz, 8 ohms), from CD/VIDEO	
20 Watts per channel power output	No more than 0.2%

Tape Deck Section

Systems	4 track, 2-channel stereo
Heads	"Hard Permalloy" recording/playback head x 1
	"Hard Permalloy" playback head x 1
	"Ferrite" erasing head x 1
	Dummy head x 1
Motor	DC servo 2 speed motor x 2
Wow and Flutter	No more than 0.08% (WRMS)
	No more than $\pm 0.20\%$ (DIN)
Fast Winding Time	Approximately 115 seconds (C-60 tape)
Frequency Response	
-20 dB recording:	
Normal tape	35 to 13,000 Hz
Metal tape	35 to 15,000 Hz
Signal-to-Noise Ratio	
Dolby NR OFF	More than 55 dB
Noise Reduction Effect	
Dolby NR ON	More than 10 dB (at 5 kHz)

Furnished Parts

Operating Instructions	1
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Miscellaneous

Power requirements	
KU and KC models	AC 120 V, 60 Hz
HE model	AC 220 V, 50/60Hz
HB and YP models	AC 240 V, 50/60 Hz
S and S/G models	AC 110 V/120 V/220 V/240 V, 50/60 Hz (switchable)

Power Consumption

KU model	199 W
KC model	199 W
HE, HB, and YP models	300 W
S and S/G models	199 W
Dimensions	360(W) x 188(H) x 224 (D) mm
	14-3/16(W) x 7-6/16(H) x 8-13/16(D) in
Weight (without package)	7 kg (15 lb 7 oz)

QUESTIONNAIRE

MODEL _____

One Model per questionnaire

Dear Servicer,

Thank you for your cooperation in the post-sale service of Pioneer products.

This questionnaire is used as a tool to improve the serviceability of our products and service manuals. Please evaluate this model and service manual by answering the following questions. Your ideas may be realized in our future products. Your answers will be appreciated. Thank you.

PIONEER ELECTRONIC CORP.

T. Nakagawa, Manager, Service Section, International Division

1. SERVICING EVALUATION	Circle applicable number:	Good	Fair	Poor		
a. Disassembly/Re-assembly:		1	2	3	*4	*5
b. Circuit Checks:		1	2	3	*4	*5
c. Replacement of Parts:		1	2	3	*4	*5
d. Adjustment (s):		1	2	3	*4	*5

* If (4) or (5) was circled, please be specific.

e. Your advice, opinion or ideas related to servicing this product.

2. SERVICE MANUAL EVALUATION

a. Circuit & Mechanism Description

b. Circuit Diagram

3. OTHER

Please describe other areas of servicing which you may find difficult.

Completed by :

Date :

Company Name :

Address :

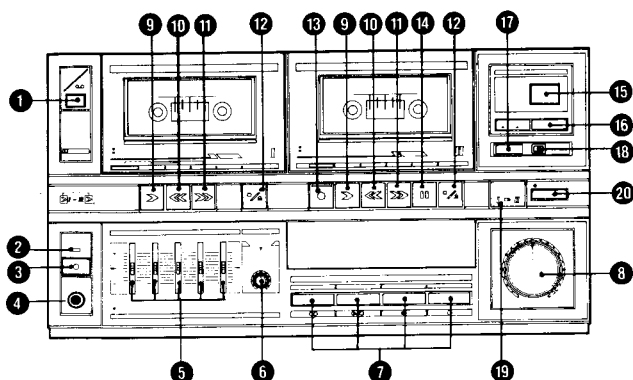
City/State/Zip :

Please send this form filled to the distributor in your country.

2. FRONT PANEL FACILITIES

Deck I (Only for playback)

Deck II (Recording/Playback)



1 REC indicator

This lights during the recording mode.

2 POWER indicator

3 POWER switch

4 HEADPHONES jack

5 5-BAND GRAPHIC EQUALIZER controls

By operating these five controls, equalization effects can be added to program source or tape playback sounds.

6 BALANCE control

7 FUNCTION switches

TAPE (∞): Push when playing back tapes.

CD/VIDEO (∞ ∞): Push when listening to a component connected to the CD/VIDEO terminals.

TUNER (*): Push when listening to broadcasts on the tuner.

PHONO (∞): Push when playing records on the turntable.

8 VOLUME control

9 PLAY switch (▶)

10 REW switch (◀)

11 FF switch (▶▶)

12 STOP/ EJECT switch (⏏)

13 REC switch (⏻)

14 PAUSE switch (⏸)

15 HIGH SPEED COPY switch

OFF (■): Tapes are copied at the normal speed.

ON (▬): Tapes are copied at twice the normal speed.

NOTE:

- Do not change the switch position during tape copying.
- When this switch is set to the ON position, recording of an external source (equipment connected to the CD/VIDEO terminals, a turntable or tuner) is not possible. When not performing high speed tape copying, always leave in the OFF position.

16 *DOLBY NR switch

Push this switch to ON when recording with the built-in Dolby noise reduction system, and when playing back tapes which have been recorded using the system.

~~~~~  
 \*Noise Reduction manufactured under license from Dolby Laboratories Licensing Corporation.  
 "Dolby" and the double-D symbol are trademarks of the Dolby Laboratories Licensing Corporation.  
 ~~~~~

17 TAPE COUNTER

This indicates the transport position of the tape loaded in Deck II with a three-digit number.

18 RESET button

Push this button to reset the tape counter display to 000.

19 SYNCHRO REC START switch

When this switch is pressed, Deck I will enter the playback mode, and Deck II will simultaneously begin recording.

20 REC MUTE switch

Use for creating non-recorded blank spaces on the tape.

3. DISASSEMBLY

CASSETTE REPLACEMENT PROCEDURES

1. Remove 5 pieces of screw ①.
2. Remove Bonnet case.
3. Remove 2 pieces of screw ②, and 1 piece of nut ②.
4. Push the claw at the bottom of chassis, remove the Front panel assembly, and pull out toward you. Remove the LED assembly from the Front panel assembly.
5. Remove 6 pieces of screw ③, and enable the Power amplifier assembly to move upward (See Fig. 3-2)
6. Remove connectors J7, J11, J14, J15, and J19 of the wiring coming out of the Tape transport unit. (Separate the front panel from the main body.)
7. Remove 7 pieces of screw ④, and remove Deck holder (with Synchro plate).
8. Open Cassette door. (See Fig. 3-3)
9. Remove 4 individual pieces of screw ⑤.
10. Remove Counter belt from Tape counter, and hook onto the Tape transport unit 2.
11. Remove the Tape transport unit 1 and 2 from the Front panel assembly.

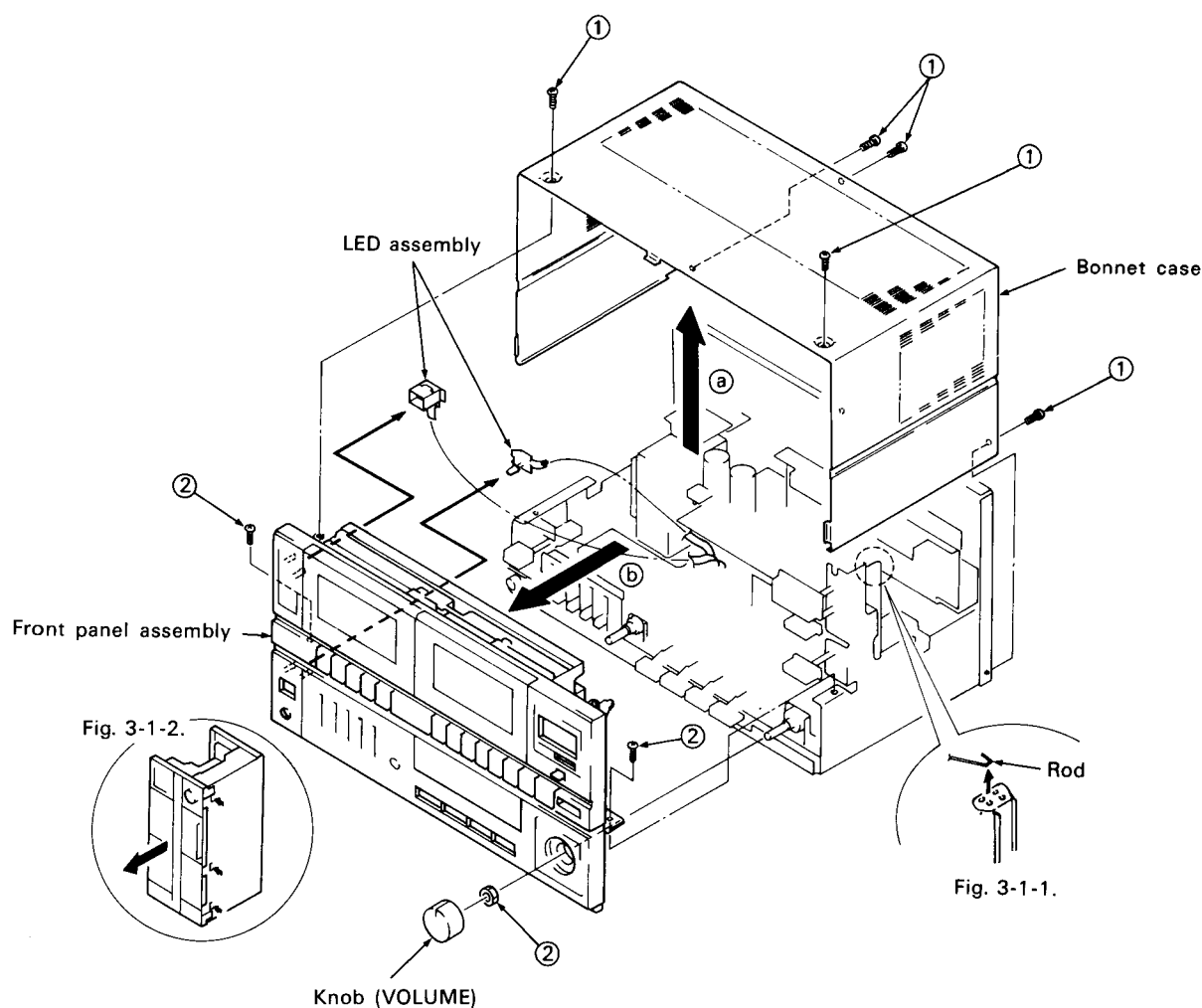


Fig. 3-1

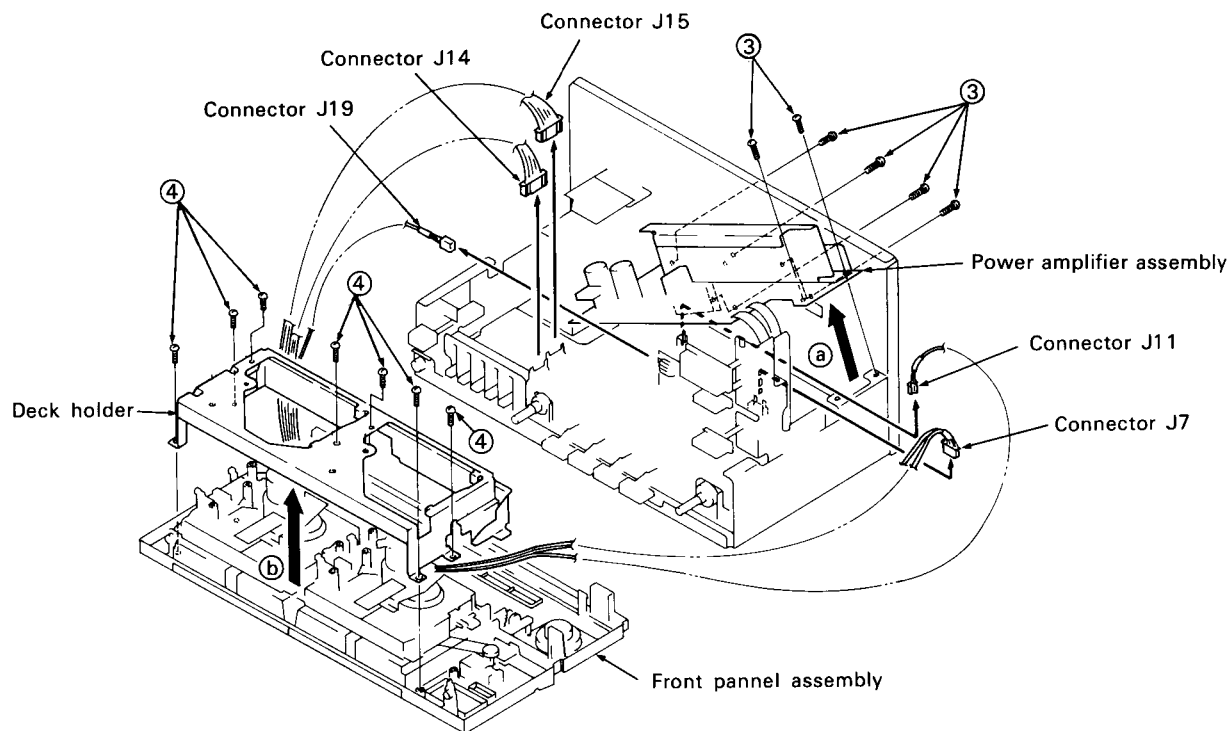


Fig. 3-2

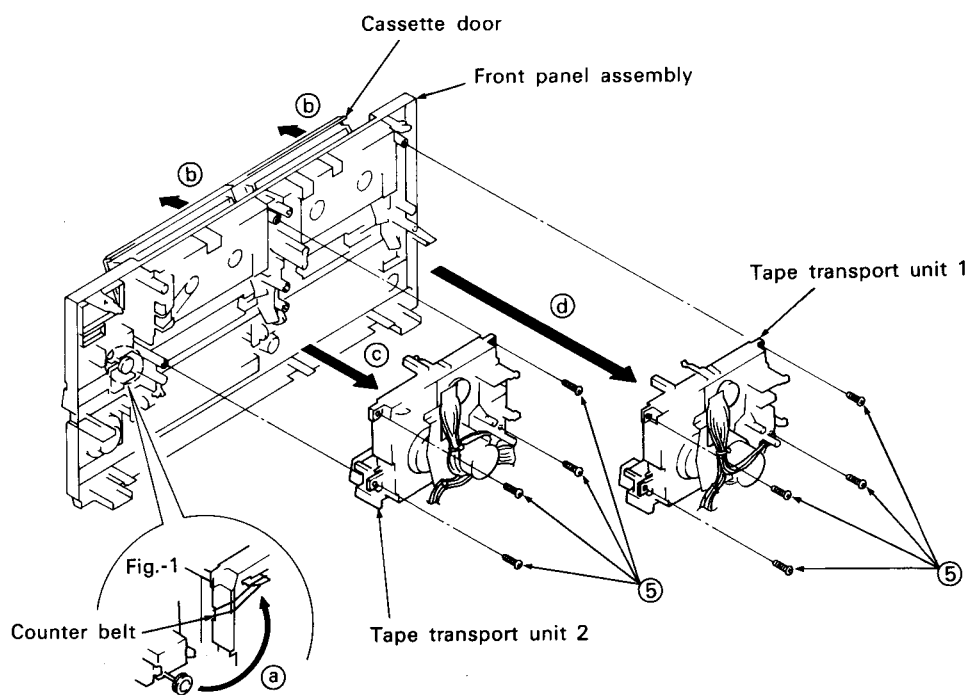


Fig. 3-3

COMPONENT PARTS REPLACEMENT PROCEDURES

Replacement of Motor

1. Remove lead wire of motor terminal. (See Fig. 3-5)
2. Remove set screw ①, and detach Relay board.
3. Remove set screw ②, and detach Motor holder. (See Fig. 3-4)
4. Remove 2 set screws ③ of Motor, and detach Motor.
5. Pull out Motor pulley from Motor.
6. Attach Motor pulley to new Motor.
7. Adjust the height of Motor pulley. (See Fig. 3-4-1).
8. Attach Motor to Motor holder.
9. While applying the Belt on the flywheel side, attach Motor holder to Tape transport unit.
10. Apply Belt to driving pulley and pulley.
11. Attach Relay board with screw ①.
12. Solder lead wire to motor terminal.
13. Fasten securely head lead and control lead with binder.
14. Adjust the tape speed.

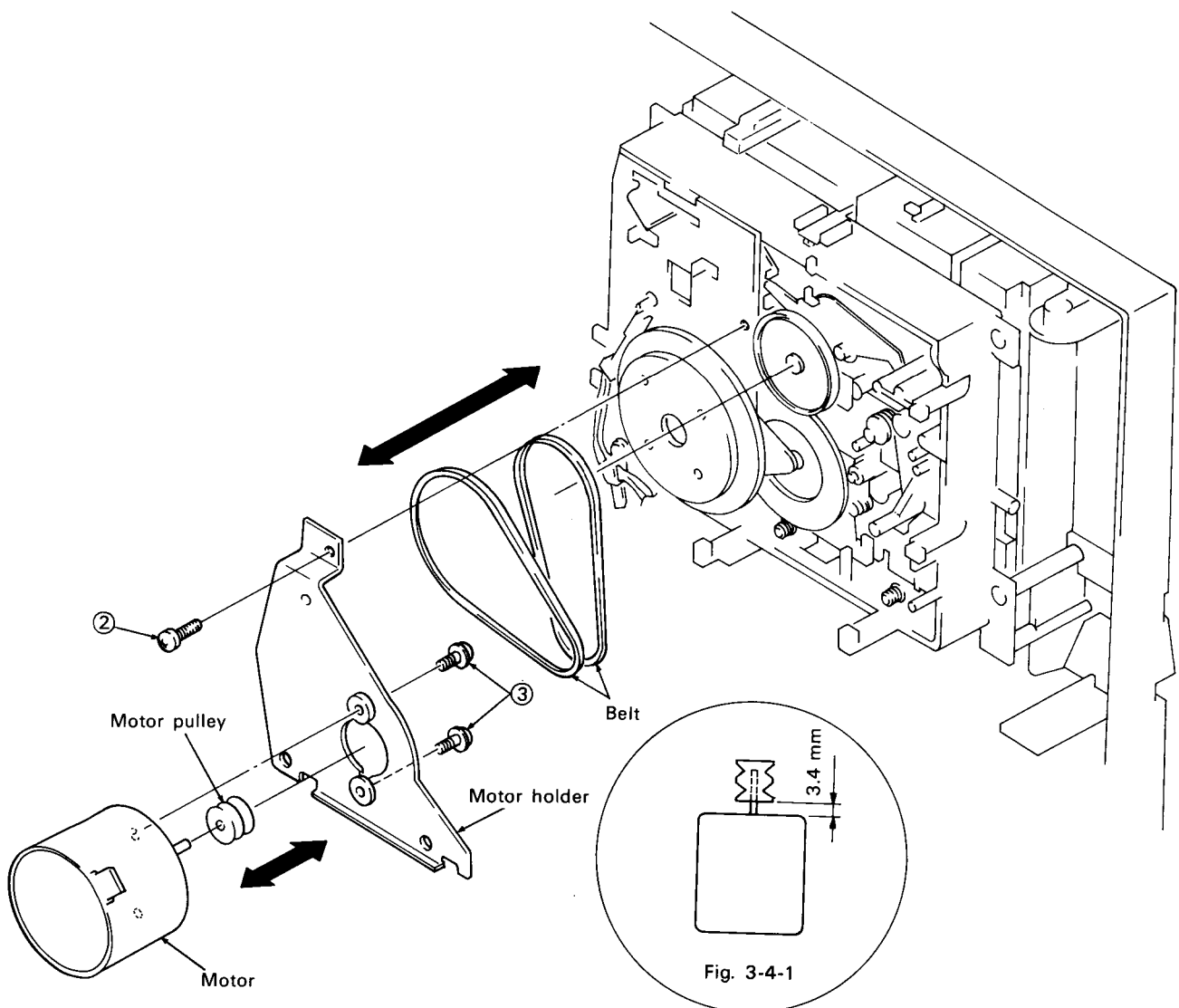


Fig. 3-4

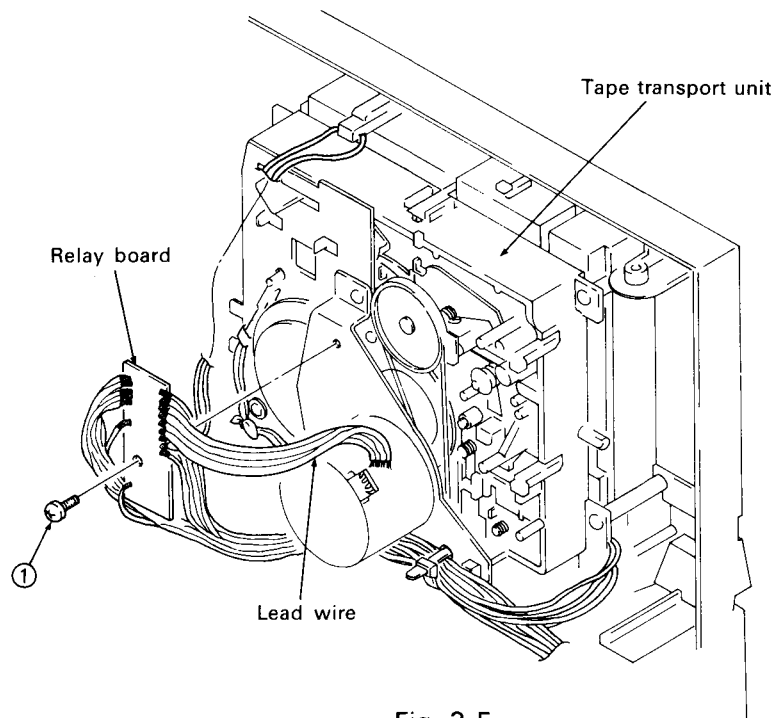


Fig. 3-5

Replacement of Belt

1. Remove set screw ①, and detach Relay board.
2. Remove set screw ②, and detach Motor holder from the Tape transport unit.
3. Replace the old belt with a new one.
4. While applying the belt on the flywheel side, attach Motor holder to the Tape transport unit.
5. Apply belt to driving pulley and pulley.
6. Fasten Relay board with screw ①.
7. Fasten securely head lead and control lead with binder.
8. Adjust the tape speed.

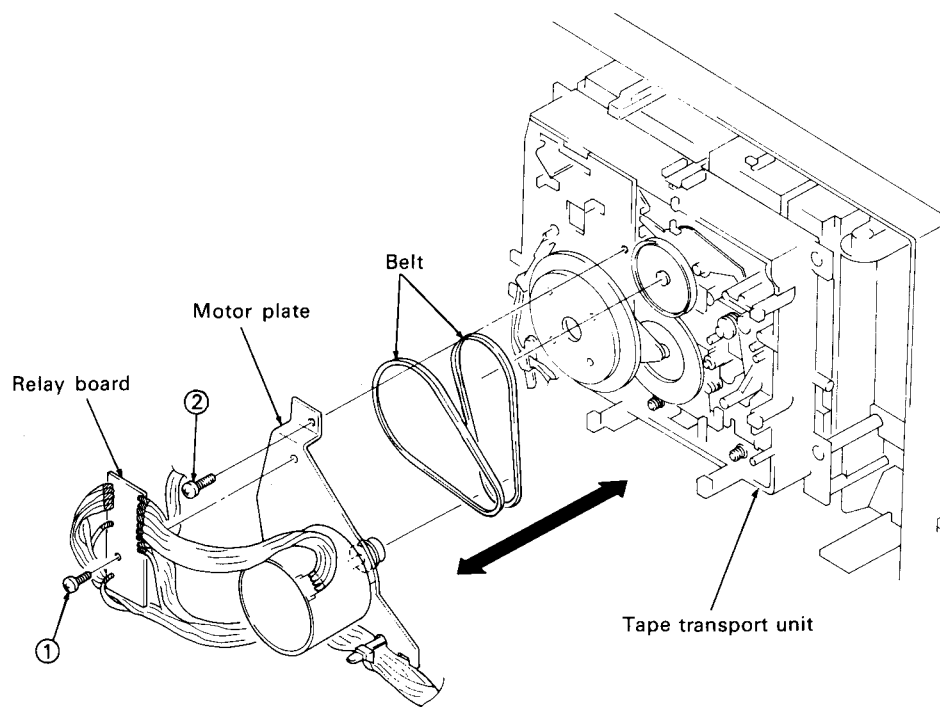


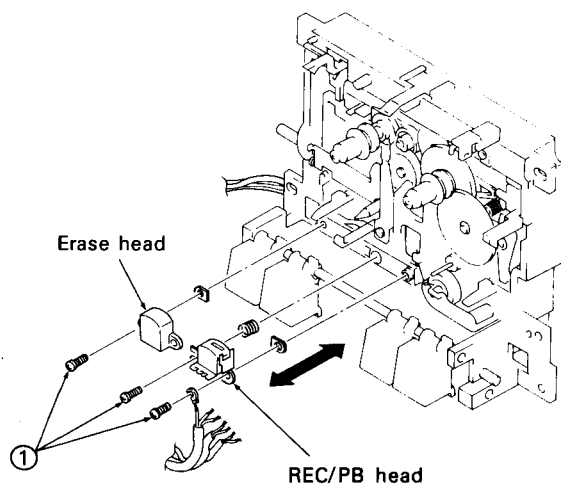
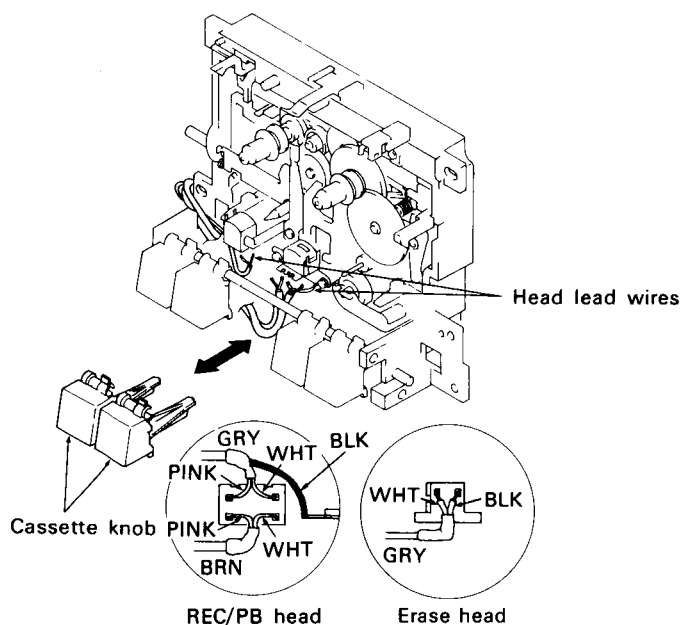
Fig. 3-6

Replacement of Head

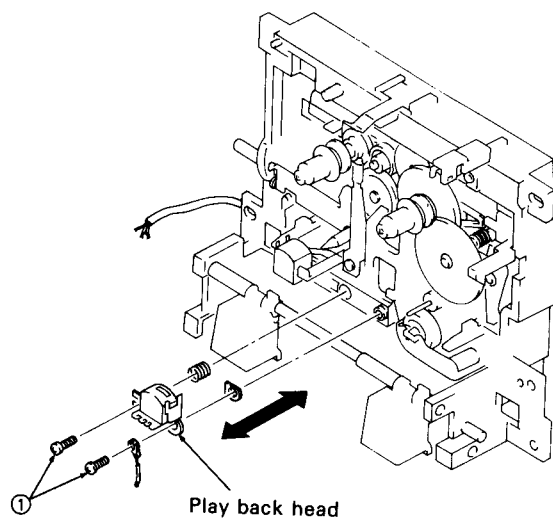
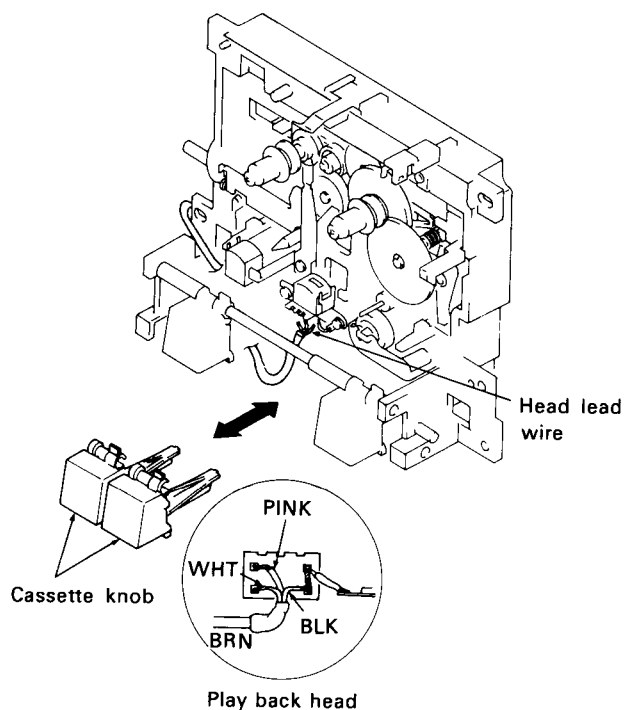
1. Detach cassette knob.
2. Remove head lead from head.
3. Remove set screw ① of head.
4. Remove former head and install a new one.
5. Solder head lead while taking precaution not to touch the wirings.

6. Attach cassette knob.
7. Check the running of tape.
8. Perform azimuth adjustment.
9. Perform bias adjustment.

Tape transport unit 2



Tape transport unit 1

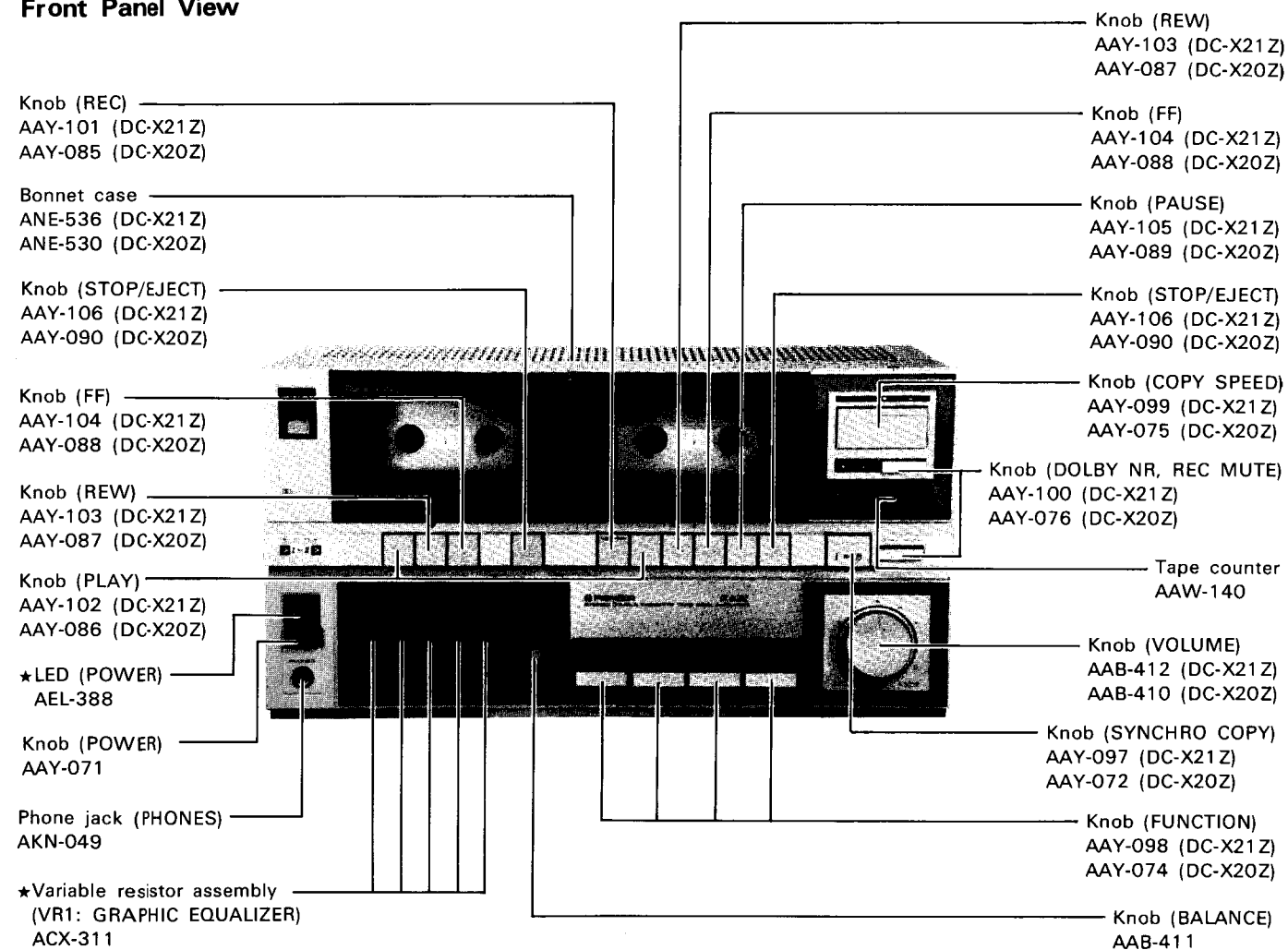


4. PARTS LOCATION

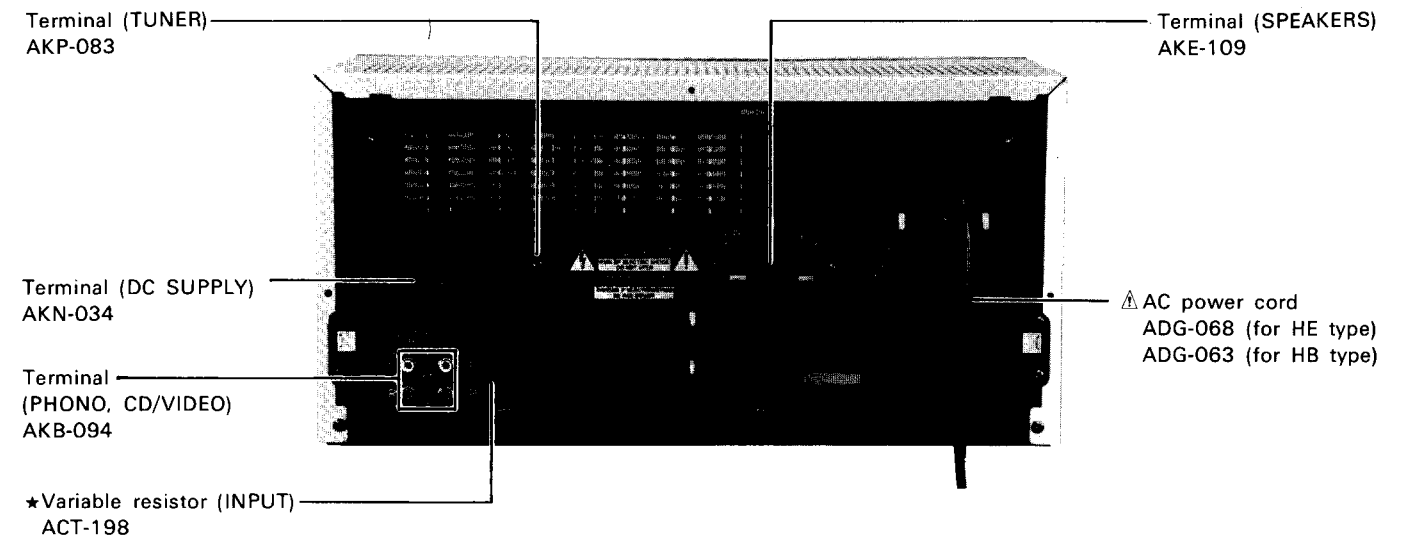
NOTES:

- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★** and **★**.
★ ★ GENERALLY MOVES FASTER THAN ★
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

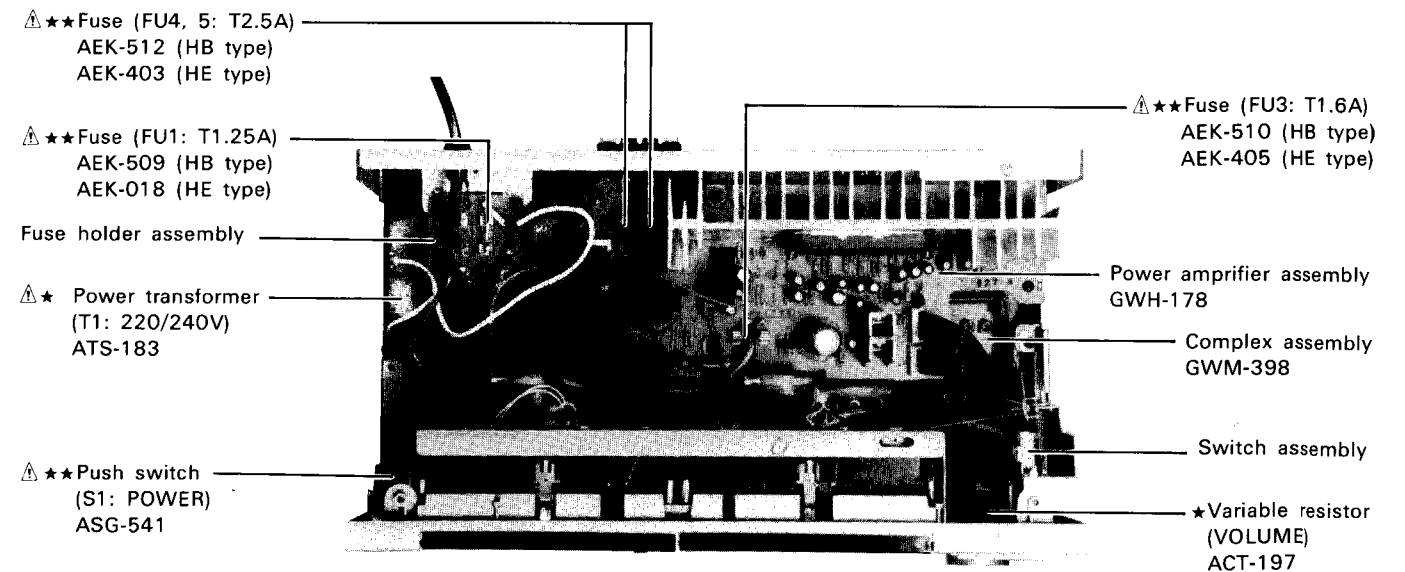
Front Panel View



Rear Panel View



Top View



5. EXPLODED VIEW

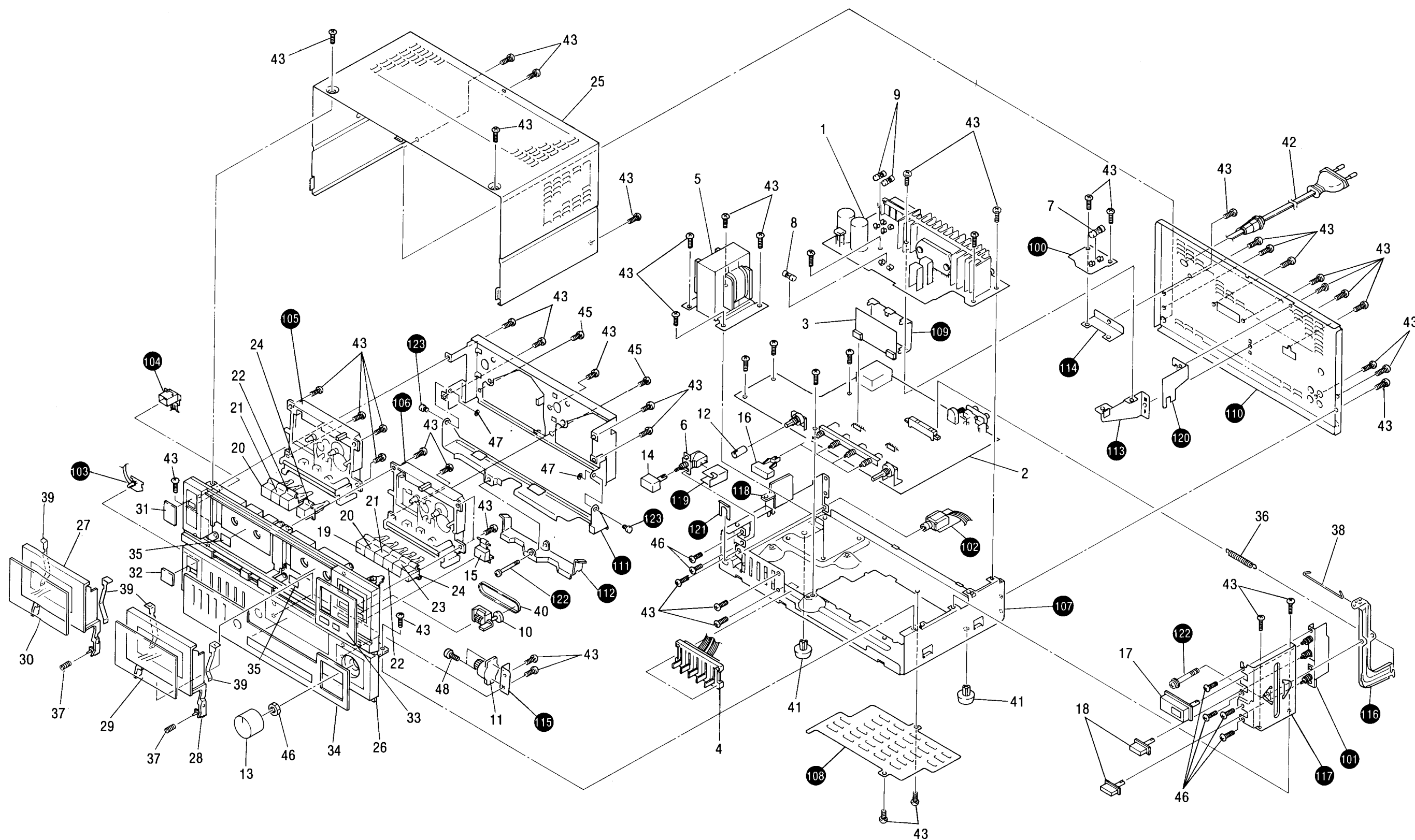
- NOTES:
- Parts without part number cannot be supplied.
 - The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★ **GENERALLY MOVES FASTER THAN ★**
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List of Exterior

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	GWH-178	Power amplifier assembly		17	AAY-099	Knob (COPY SPEED)
	2	GWM-398	Complex assembly			(DC-X21Z)	
	3	GWY-187	PB EQ assembly			AAY-075	
★	4	ACX-311	Variable resistor assembly			(DC-X20Z)	
⚠ ★	5	ATS-183	Power transformer (220/240V)		18	AAY-100	Knob
						(DC-X21Z)	
⚠ ★★	6	ASG-541	Push switch (POWER)			AAY-076	(DOLBY NR, REC MUTE)
⚠ ★★	7	AEK-509	Fuse (T1.25A)			(DC-X20Z)	
		(HB type)			19	AAY-101	Knob (REC)
		AEK-018				(DC-X21Z)	
		(HE type)				AAY-085	
⚠ ★★	8	AEK-510	Fuse (T1.6A)			(DC-X20Z)	
		(HB type)			20	AAY-102	Knob (PLAY)
		AEK-405				(DC-X21Z)	
		(HE type)				AAY-086	
⚠ ★★	9	AEK-512	Fuse (T2.5A)			(DC-X20Z)	
		(HB type)			21	AAY-103	Knob (REW)
		AEK-403				(DC-X21Z)	
		(HE type)				AAY-087	
	10	AAW-140	Tape counter			(DC-X20Z)	
	11	ANZ-044	Damper assembly		22	AAY-104	Knob (FF)
	12	AAB-411	Knob (BALANCE)			(DC-X21Z)	
	13	AAB-412	Knob (VOLUME)			AAY-088	
		(DC-X21Z)				(DC-X20Z)	
		AAB-410			23	AAY-105	Knob (PAUSE)
		(DC-X20Z)				(DC-X21Z)	
	14	AAY-071	Knob (POWER)			AAY-089	
	15	AAY-097	Knob (SYNCHRO COPY)			(DC-X20Z)	
		(DC-X21Z)			24	AAY-106	Knob (STOP/EJECT)
		AAY-072				(DC-X21Z)	
		(DC-X20Z)				AAY-090	
	16	AAY-098	Knob (FUNCTION)			(DC-X20Z)	
		(DC-X21Z)				(HE type)	
		AAY-074					
		(DC-X20Z)					

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	25	ANE-536	Bonnet case		43	BBZ30P080FZK	Screw 3×8
		(DC-X21Z)			44	NK90FUC	Nut
		ANE-530			45	PBZ26P060FMC	Screw 2.6×6
		(DC-X20Z)			46	VMZ30P060FMC	Screw 3×6
	26	ANM-847	Front panel		47	YE30FUC	Washer E-type
		(DC-X21Z)			48	PBZ20P040FMC	Screw 2×4
		ANM-867					
		(DC-X20Z)			100		Fuse holder Assembly
★★	27	ANR-964	Door (L)		101		Switch assembly
					102		Headphone jack assembly
★★	28	ANR-965	Door (R)		103		LED assembly (A)
	29	ANR-971	Door panel R		104		LED assembly (B)
	30	ANR-972	Door panel L				
	31	ANR-973	REC panel		105		Tape transport unit 1
	32	ANR-974	POWER panel		106		Tape transport unit 2
					107		Chassis
	33	ANR-986	Deck panel		108		Bottom plate
		(DC-X21Z)			109		Shield plate
		ANR-970					
		(DC-X20Z)			110		Rear panel
	34	ANR-985	Amp panel		111		Synchro plate
		(DC-X21Z)			112		Balance plate
		ANR-975			113		Heat sink holder
		(DC-X20E)			114		P.C.B holder
	35	AAX-426	Shine paper		115		Damper holder
					116		REC lever
	36	ABH-146	REC spring		117		REC base
	37	ABH-147	Coiled spring		118		Transformer barrier
	38	ABH-148	Rod		119		Switch barrier
	39	ABK-012	Keep plate				
★★	40	AEB-197	Counter belt		120		Heat sink stopper
					121		Clamp plate
	41	AEC-847	Leg assembly		122		Screw
⚠	42	ADG-063	AC power cord		123		Boss
		(HB type)			124		Binder
		ADG-068					
		(HE type)					

Exterior



NOTES:

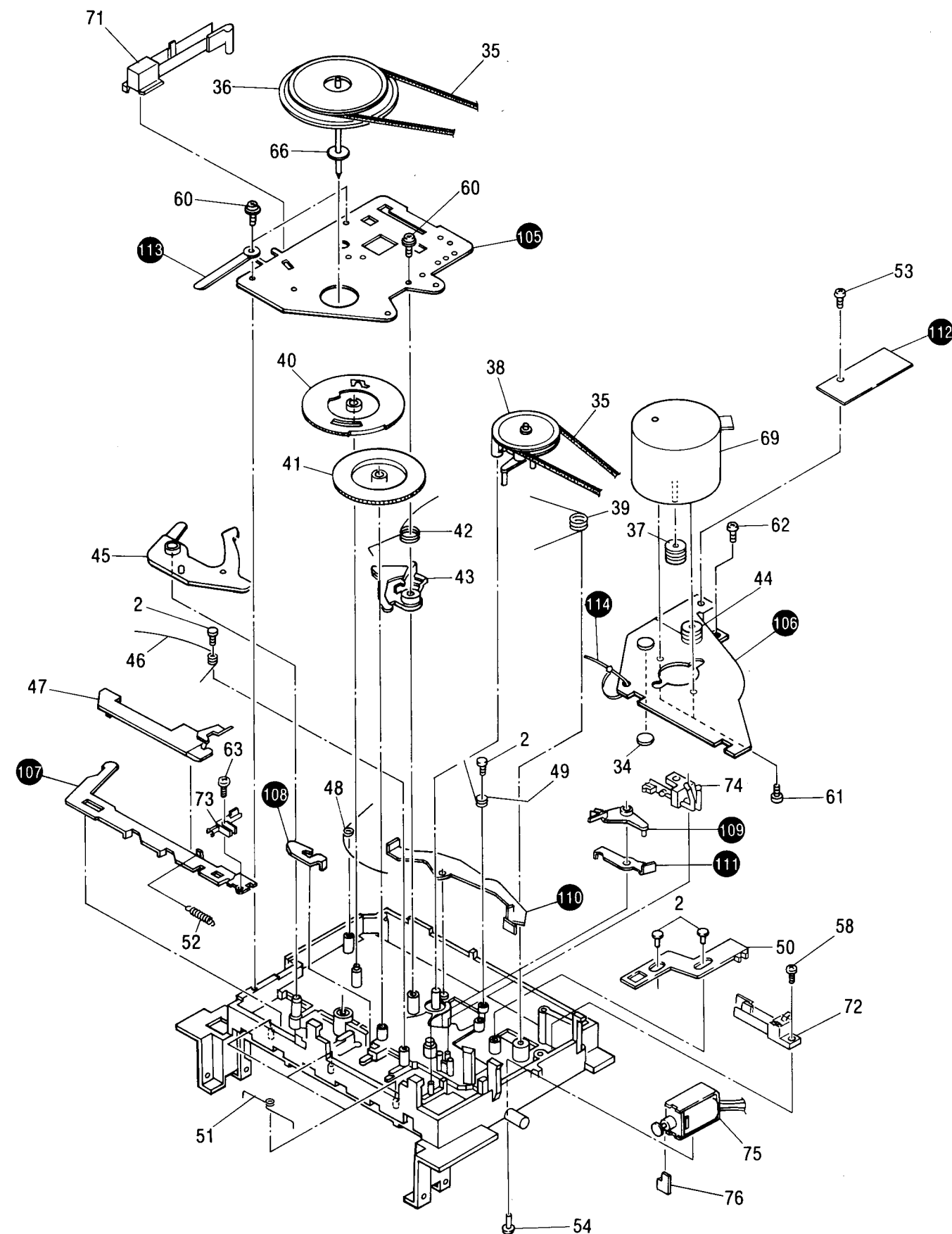
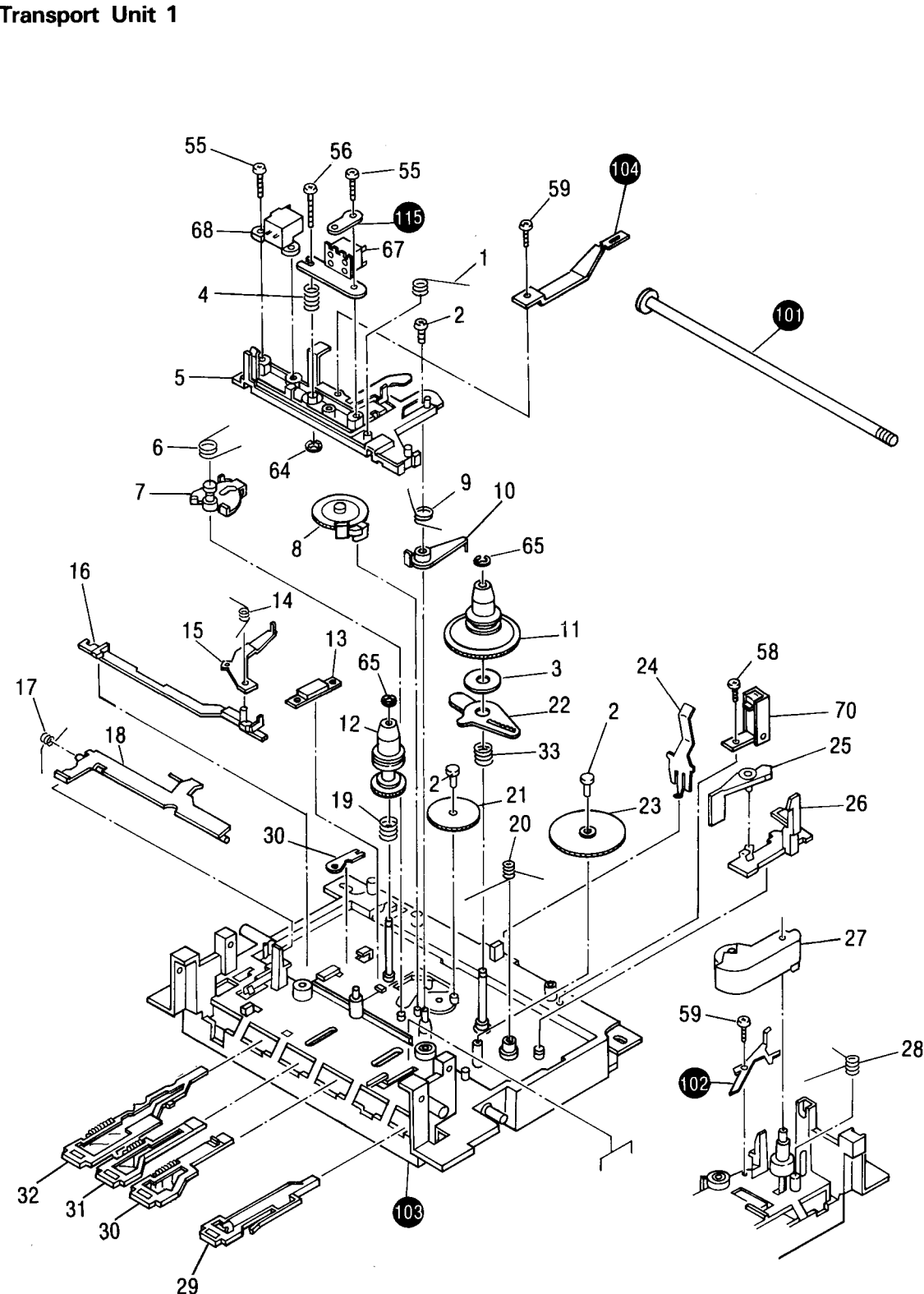
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- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.
★★ GENERALLY MOVES FASTER THAN ★
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List of Tape Transport Unit 1

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	AXV-087	Torsion spring		41	AXS-095	Assist gear B
	2	AXT-007	Bush		42	AXV-098	Torsion spring
	3	AXW-034	Felt		43	AXS-096	P cam lever
	4	AXV-064	Compression spring		44	AXW-024	Rubber grommet
	5	AXS-078	Head base		45	AXS-097	CR cam lever
	6	AXV-088	Torsion spring		46	AXV-099	Torsion spring
	7	AXS-079	FR arm		47	AXS-106	FR start lever
★★	8	AXP-037	P idler assembly		48	AXV-100	Torsion spring
	9	AXV-089	Torsion spring		49	AXV-101	Torsion spring
	10	AXS-080	Reset lever		50	AXS-104	Assistance plate
★★	11	AXP-038	T reel assembly		51	AXV-102	Torsion spring
★★	12	AXP-039	S reel assembly		52	AXV-105	Torsion spring
	13	AXS-081	FR release lever		53	BDZ26P050FMC	Screw 2.6×5
	14	AXV-090	Torsion spring		54	BMZ20P050FMC	Screw 2×5
	15	AXS-082	P release lever		55	BTZ20P080FMC	Screw 2×8
	16	AXS-083	PL plate		56	BMZ20P100FMC	Screw 2×10
	17	AXV-091	Torsion spring		57	BDZ17P070FMC	Screw 1.7×7
	18	AXS-099	FR plate		58	PTZ26P060FMC	Screw 2.6×6
	19	AXV-092	S brake spring		59	BTZ20P050FMC	Screw 2×5
	20	AXV-093	Torsion spring		60	BTZ26P060FMC	Screw 2.6×6
	21	AXS-084	F idler gear		61	AXT-009	Motor set screw
	22	AXS-085	Sensor cam		62	PDZ26P040FMC	Screw 2.6×4
	23	AXS-086	AS gear		63	BMZ20P060FMC	Screw 2×6
	24	AXV-094	Cassette holder		64	NA20FMC	Nut M2
	25	AXS-087	Eject cam		65	WA16D040D020	Washer 1.6×4×0.2
	26	AXS-088	Latch lever		66	WA21D040D030	Washer 2.1×4×0.3
★★	27	AXP-040	Pinch arm assembly	★★	67	AXN-033	Playback head
	28	AXV-095	Torsion spring		68	AXN-016	Dummy head
	29	AXS-089	SE lever	★★	69	AXM-013	Motor
	30	AXS-091	FF lever	★★	70	AXN-024	Spring switch (S22, Cr02)
	31	AXS-092	REW lever	★★	71	AXN-025	Spring switch (S21, MUTE)
	32	AXS-093	PL lever B	★★	72	AXN-026	Spring switch (S23, PLAY)
	33	AXV-096	Torsion spring	★★	73	AXN-027	Spring switch (S25, MS)
	34	AXW-035	Thrust receptacle	★★	74	AXN-030	Spring switch (S24, MAIN)
★★	35	AXW-037	Belt	★	75	AXN-028	Solenoid (PM1, MS)
	36	AXP-041	Flywheel assembly		76	AXS-105	FR stopper
	37	AXS-103	Motor pulley				
★★	38	AXP-042	FR idler arm assembly				
	39	AXV-104	Torsion spring				
	40	AXS-094	Assist gear A				

Mark	No.	Part No.	Description
	101		Button shaft
	102		Grounding lug
	103		Chassis
	104		REV plate
	105		Gear holder
	106		Motor holder
	107		FR S lever
	108		Protector
	109		MS W lever
	110		PL start lever
	111		CR S lever
	112		Relay board
	113		Cord fixer
	114		Wire tie
	115		Lug

Tape Transport Unit 1



NOTES:

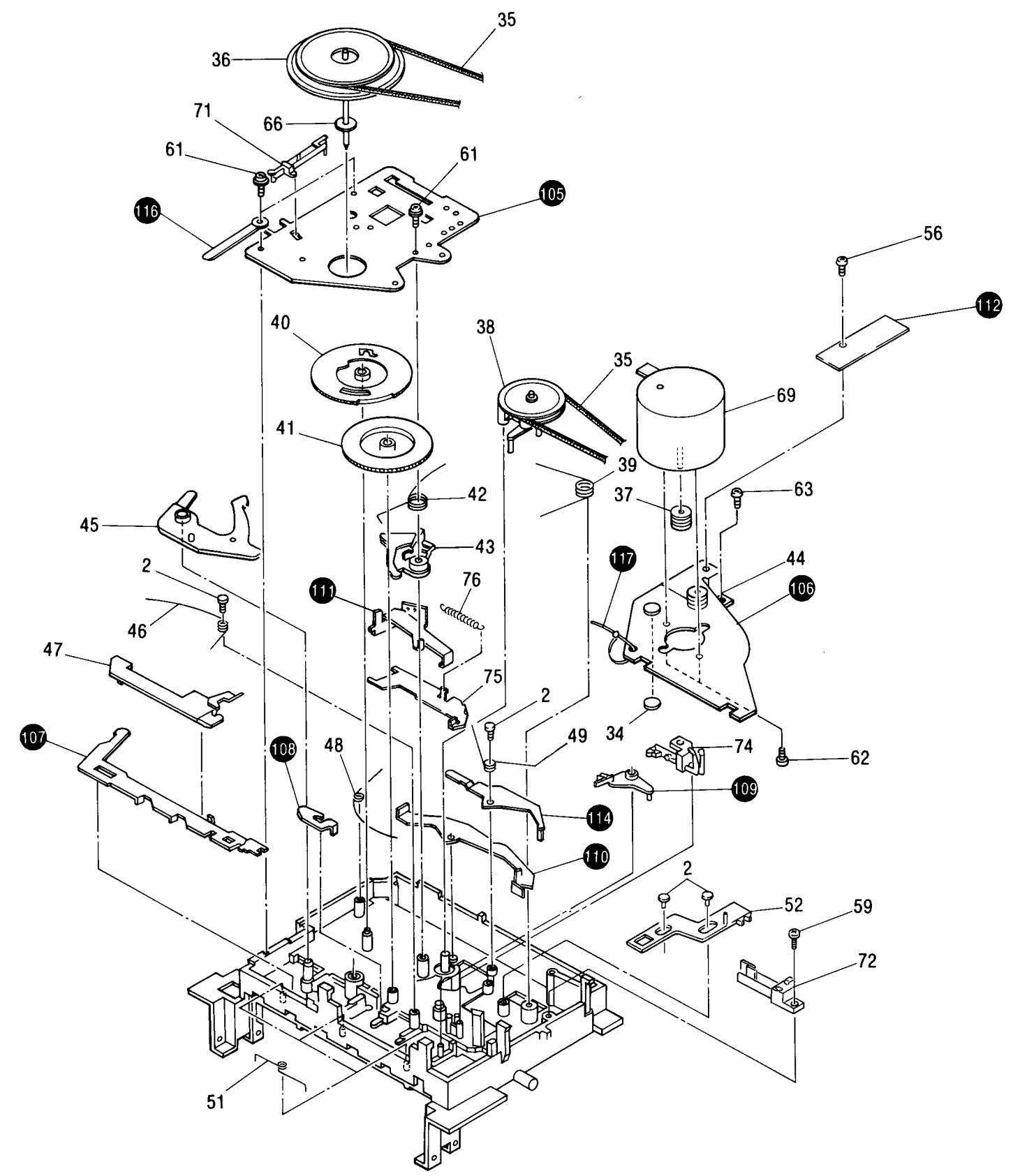
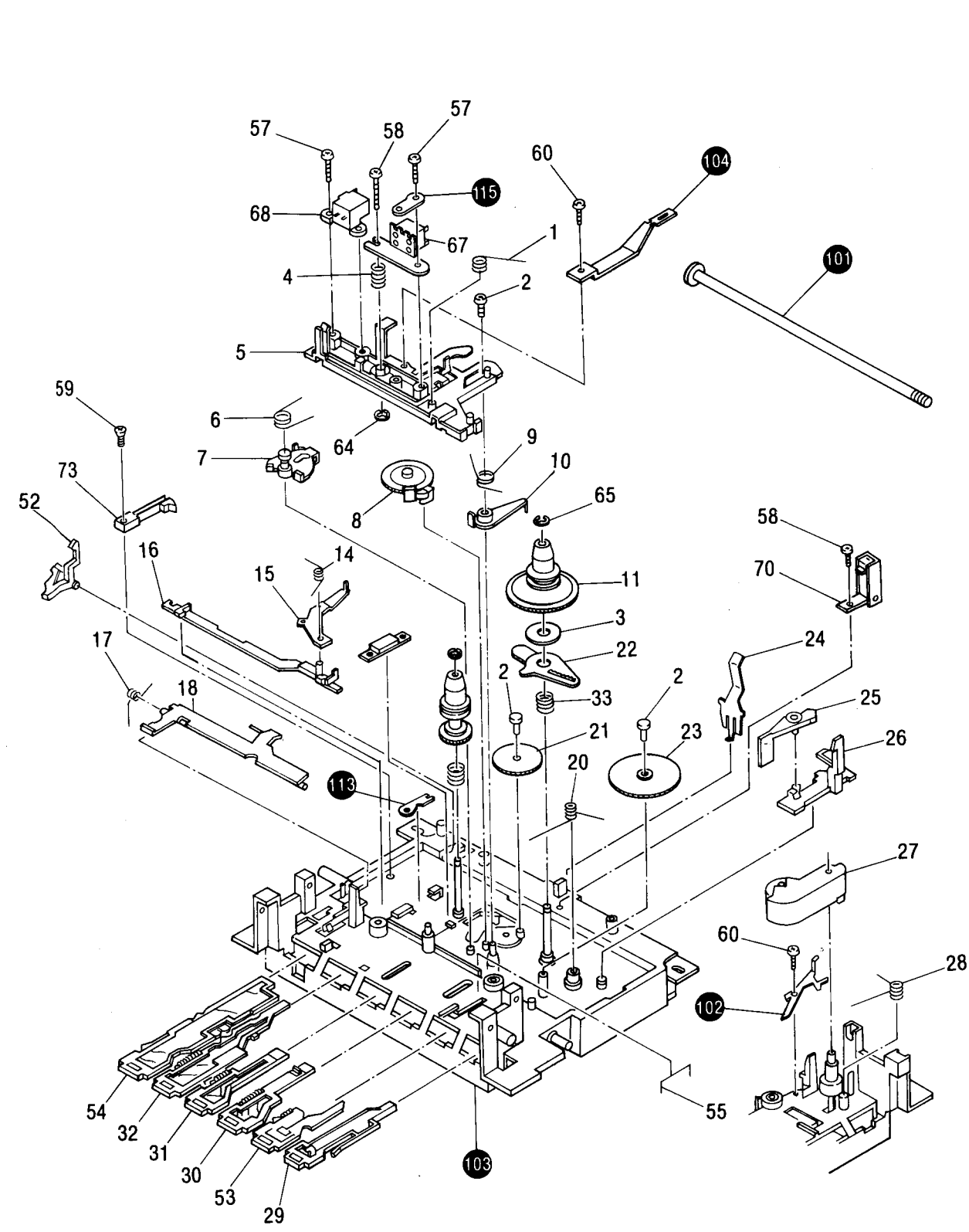
- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.
★★ GENERALLY MOVES FASTER THAN ★
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List of Tape Transport Unit 2

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	AXV-087	Torsion spring		41	AXS-095	Assist gear B
	2	AXT-007	Bush		42	AXV-098	Torsion spring
	3	AXW-034	Felt		43	AXS-096	P cam lever
	4	AXV-064	Compression spring		44	AXW-024	Rubber grommet
	5	AXS-078	Head base		45	AXS-097	CR cam lever
	6	AXV-088	Torsion spring		46	AXV-099	Torsion spring
	7	AXS-079	FR arm		47	AXS-106	FR start lever
★★	8	AXP-037	P idler assembly		48	AXV-100	Torsion spring
	9	AXV-089	Torsion spring		49	AXV-101	Torsion spring
	10	AXS-080	Reset lever		50	AXS-104	Assistance plate
★★	11	AXP-038	T reel assembly		51	AXV-102	Torsion spring
★★	12	AXP-039	S reel assembly		52	AXS-098	Interlock plate
	13	AXS-081	FR release lever		53	AXS-090	Pause lever
	14	AXV-090	Torsion spring		54	AXS-100	REC lever
	15	AXS-082	P release lever		55	AXV-103	Lock pin
	16	AXS-083	PL plate		56	BDZ26P050FMC	Screw 2.6×5
	17	AXV-091	Torsion spring		57	BTZ20P080FMC	Screw 2×8
	18	AXS-099	FR plate		58	BMZ20P100FMC	Screw 2×10
	19	AXV-092	S brake spring		59	PTZ26P060FMC	Screw 2.6×6
	20	AXV-093	Torsion spring		60	BTZ20P050FMC	Screw 2×5
	21	AXS-084	F idler gear		61	BTZ26P060FMC	Screw 2.6×6
	22	AXS-085	Sensor cam		62	AXT-009	Motor set screw
	23	AXS-086	AS gear		63	PDZ26P040FMC	Screw 2.6×4
	24	AXV-094	Cassette holder		64	NA20FMC	Nut M2
	25	AXS-087	Eject cam		65	WA16D040D020	Washer 1.6×4×0.2
	26	AXS-088	Latch lever		66	WA21D040D030	Washer 2.1×4×0.3
★★	27	AXP-040	Pinch arm assembly	★★	67	AXN-031	REC/PB head
	28	AXV-095	Torsion spring	★	68	AXN-032	Erase head
	29	AXS-089	SE lever	★★	69	AXM-013	Motor
	30	AXS-091	FF lever	★★	70	AXN-024	Spring switch (S32, METAL)
	31	AXS-092	REW lever	★★	71	AXN-025	Spring switch (S31, MUTE)
	32	AXS-093	PL lever B	★★	72	AXN-026	Spring switch (S33, PLAY)
	33	AXV-096	Torsion spring	★★	73	AXN-029	Spring switch (S36, REC KNOB)
	34	AXW-035	Thrust receptacle	★★	74	AXN-030	Spring switch (S34, MAIN)
★★	35	AXW-037	Belt		75	AXS-102	REC link lever
	36	AXP-041	Flywheel assembly		76	AXV-106	Tension spring
	37	AXS-103	Motor pulley				
★★	38	AXP-042	FR idler arm assembly				
	39	AXV-104	Torsion spring				
	40	AXS-094	Assist gear A				

Mark	No.	Part No.	Description
	101		Button shaft
	102		Grounding lug
	103		Chassis
	104		REV plate
	105		Gear holder
	106		Motor holder
	107		FR S lever
	108		Protector
	109		MS W lever
	110		PL start lever
	111		RSW lever
	112		Relay board
	113		REC protector
	114		REC change plate
	115		Lug
	116		Cord fixer
	117		Wire tie

Tape Transport Unit 2



6. ELECTRICAL PARTS LIST

NOTES:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω 56 × 10¹ 561.....RD4PS 561 J
 47kΩ 47 × 10³ 473.....RD4PS 473 J
 0.5Ω 0R5RN2H 0R5 K
 1Ω 010RS1P 010 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ 562 × 10¹ 5621....RN4SR 5621 F

- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.
★★ GENERALLY MOVES FASTER THAN ★
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Power amplifier assembly	GWH-178
	Complex assembly	GWM-398
	PB. EQ assembly	GWY-187
	Switch assembly	non supply
	Headphone jack assembly	non supply
	Fuse holder assembly	non supply
	LED assembly (B)	non supply
	LED assembly (A)	non supply

SWITCH

Mark	Symbol & Description	Part No.
Δ ★★	S1 Push switch (POWER)	ASG-541

TRANSFORMER

Mark	Symbol & Description	Part No.
Δ ★	T1 Power transformer (220/240V)	ATS-183

RESISTOR

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR1 Variable resistor assembly ACX-311 (GRAPHIC EQUALIZER)	

FUSES

Mark	Symbol & Description	Part No.
Δ ★★	FU1 Fuse (T1.25A)	AEK-018 (HE) AEK-509 (HB)
Δ ★★	FU4, FU5 Fuse (T2.5A)	AEK-403 (HE) AEK-512 (HB)
Δ ★★	FU3 Fuse (T1.6A)	AEK-405 (HE) AEK-510 (HB)

OTHERS

Mark	Symbol & Description	Part No.
Δ	AC Power cord (for HE type)	ADG-068
	(for HB type)	ADG-063
Δ	C1 Ceramic capacitor	ACG-502

Complex Assembly (GWM-398) SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC701, IC702	BA3812L
★★	IC401	HA12045
★★	IC501	M5218L
★★	IC601	M5218P
★★	IC301	M5220L
★★	IC801	TA7341P
★★	Q803, Q806	DTA124ES (RN2203)
★★	Q842	DTA143ES (RN2201)
★★	Q805, Q809, Q810, Q811, Q841	DTC124ES (RN1203)
★★	Q802, Q807	DTC143ES (RN1201)
★★	Q801	2SA933S (2SA1048)
★★	Q804	2SB560
★★	Q303, Q304, Q401—Q409, Q501—Q510, Q846	2SC1740S (2SC2458)
★★	Q843	2SC2603 (2SC2458)
★★	Q844, Q845, Q851	2SD438
★★	Q301, Q302	2SC2878
★	D832, D833	RD5.6EB (HZ5.6EB)
★	D831	RD6.8EB (HZ6.8EB)

Mark	Symbol & Description	Part No.
★	D821	S5566 (11E2)
★	D401, D402, D501, D801—D804, D806—D818, D820, D822—D826, D829, D830, D834—D840	1SS131
★	D851	US1035

SWITCHES

Mark	Symbol & Description	Part No.
★★	S401 Slide switch (REC/PB)	ASH-105
★★	S701 Push switch (FUNCTION)	SUJ6L4B2B2B2LF

COILS AND TRANSFORMERS

Mark	Symbol & Description	Part No.
	F401, F402 MPX filter	ATF-167
	L801 Inductor	ATH-094
	L501, L502 Inductor	ATH-117
	L401, L402 Trap coil	ATM-034
	L503, L504 Trap coil	ATM-035
	T801 Oscillator transformer	ATX-035

CAPACITORS

Mark	Symbol & Description	Part No.
	C804 Polypropylene (680p/630V)	ACE-134
	C723, C724 Ceramic (330p/50V)	ACG-028
	C417, C418 Electrolytic (0.27/50V)	ACH-387
	C419, C420 Electrolytic (0.82/50V)	ACH-388
	C305, C306, C605—C608	CCCSL101J50 (CCDSL101J50)
	C802, C803	CCCSL101K500 (CCDSL101K500)
	C403, C404, C429, C430	CCCSL470J50 (CCDSL470J50)
	C709, C710	CEASR15M50
	C801	CEASR47M50
	C705, C706	CEASR68M50
	C303, C304, C423, C424, C517, C518, C615, C616, C813	CEASO10M50
	C311, C312, C407, C408, C425, C426, C501, C502, C519, C520, C701, C702, C727, C728, C814, C853	CEAS100M25
	C453, C725, C726	CEAS101M10
	C401, C402, C405, C406, C427, C428, C452, C603, C604	CEAS2R2M50
	C451, C454	CEAS221M16
	C307, C308, C505, C506	CEAS330M16
	C415, C416	CEAS4R7M50
	C609, C610	CEAS470M10
	C351, C352, C651, C652, C751, C809, C810	CEAS470M16

Mark	Symbol & Description	Part No.
	C715, C716	CKCYB182K50 (CKDYB182K50)
	C719, C720	CKCYB391K50 (CKDYB391K50)
	C711, C712	CKCYB392K50 (CKDYB392K50)
	C301, C302	CKCYB471K50 (CKDYB471K50)
	C521—C524	CKCYB681K50 (CKDYB681K50)
	C721, C722	CKCYB682K50 (CKDYB682K50)
	C717, C718	CKCYX153M25 (CKDYX153M25)
	C707, C708	CKCYX183M25 (CKDYX183M25)
	C703, C704	CKCYX393M25 (CKDYX393M25)
	C713, C714	CKCYX683M25 (CKDYX683M25)
	C507, C508, C806, C808, C852	CQMA103J50
	C509, C510	CQMA123J50
	C805, C807	CQMA153J50
	C503, C504	CQMA182J50
	C421, C422	CQMA183J50
	C313, C314, C851	CQMA223J50
	C611, C612	CQMA242J50
	C411, C412, C513, C514	CQMA333J50
	C511, C512	CQMA393J50
	C413, C414	CQMA472J50
	C309, C310	CQMA562J50
	C515, C516	CQMA682J50
	C613, C614	CQMA822J50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR701 Variable (BALANCE)	ACT-057
★	VR702 Variable (VOLUME)	ACT-197
★	VR601 Variable (INPUT)	ACT-198
★	VR801, VR803 Semi-fixed 10k	VRTB6VS103
★	VR841, VR842 Semi-fixed 100k	VRTB6VS104
★	VR301, VR302, VR501, VR502, VR802, VR804	VRTB6VS223
	Semi-fixed 22k	
	R842	RD1/2PM271J
	R319, R320	RD1/4PM105J
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal (PHONO, CD/VIDEO)	AKB-094

Switch Assembly SWITCHES

Mark	Symbol & Description	Part No.
★★	S902 Push switch (HIGH SPEED COPY)	SUJL2NF
★★	S901 Push switch (DOLBY NR, REC MUTE)	SUJ8L24SF

RESISTORS

Mark	Symbol & Description	Part No.
	R821	RD1/8PM427J
	R822	RD1/8PM622J

PB.EQ Assembly (GWY-187) SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC901	M5220L
★★	Q901—Q906	2SC1740S (2SC2458)
★★	Q907, Q908	2SC2878

CAPACITORS

Mark	Symbol & Description	Part No.
	C901, C902, C907, C908	CCCSL151J50 (CCDSL151J50)
	C905, C906	CEAS010M50
	C913, C914	CEAS100M25
	C909, C910	CEAS330M16
	C951, C952	CEAS470M16
	C903, C904	CKCYB331K50 (CKDYB331K50)
	C919	CKCYX473K25 (CKDYX473K25)
	C917, C918	CQMA183J50
	C915, C916	CQMA223J50
	C911, C912	CQMA562J50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR901, VR902 Semi-fixed 20k Other resistors	VRTM6H203 RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal	AKP-045

Headphone Jack Assembly

RESISTORS

Mark	Symbol & Description	Part No.
	R829, R830	RD1/2PM331J

OTHERS

Mark	Symbol & Description	Part No.
	Phone jack (PHONES)	AKN-049

LED Assembly (A)

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★	D828 LED (REC)	AEL-443

LED Assembly (B)

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★	D827 LED (POWER)	AEL-388

Power Amplifier Assembly (GWH-178)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
△ ★★	IC101	STK4171-2S
★★	IC102, IC103	μPC78M12H
★★	Q104	2SB834
★★	Q101—Q103	2SC1740S (2SC2603)
★	D101	KZL150
△ ★	D106	RB402
★	D105	RD13EB (HZ13EB)
△ ★	D103, D104, D107—D110	S5566 (11E2)
★	D102	1S2471

RELAY

Mark	Symbol & Description	Part No.
★ ★	RY101 Relay	ASR-111

COILS

Mark	Symbol & Description	Part No.
	L103, L104 AF choke coil	ATH-053

CAPACITORS

Mark	Symbol & Description	Part No.
	C131, C132 Ceramic (0.01/AC150V)	ACG-019
	C128, C129 Electrolytic (4700/50V)	ACH-252
	C105, C106	CCCSL470J50 (CCDSL470J50)
	C101, C102	CCCSL271J50 (CCDSL271J50)
	C119	CEASR47M100
	C113, C115, C116	CEAS100M50
	C107, C108	CEAS101M10
	C118	CEAS101M25
	C114	CEAS101M50
	C103, C104	CEAS2R2M50
	C127	CEAS330M25
	C130	CEAS332M25
	C109—C112, C124, C125	CEAS470M25
	C133	CEAS470M50
	C117	CEAS471M6
	C120, C121	CKCYF473Z50 (CKDYF473Z50)

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
△	R129, R130	RD1/2PMF100J
	R133, R137, R138	RD1/2PM□□□J
△	R125, R126, R141, R142, R120, R136, R134, R118, R119	RD1/4PMF□□□J
	R124	RS1LMF821J
	R131, R132	RS2LMF271J
	R139	RS2LMF4R7J
	Other resistors	RD1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal (SPEAKERS)	AKE-109
	Terminal (DC SUPPLY)	AKN-034
	Terminal (TO TUNER)	AKP-083
	Screw	ABA-271
	Heat proof rivet	AEC-940
	Screw 3×8	BBZ30P080FZK
	Screw 3×6	PBZ30P060FMC

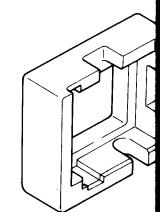
Fuse Holder Assembly

RESISTOR

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
△	R140 Carbon composition (2.2M1/2W)	ACN-209

7. PAC



Line Voltage

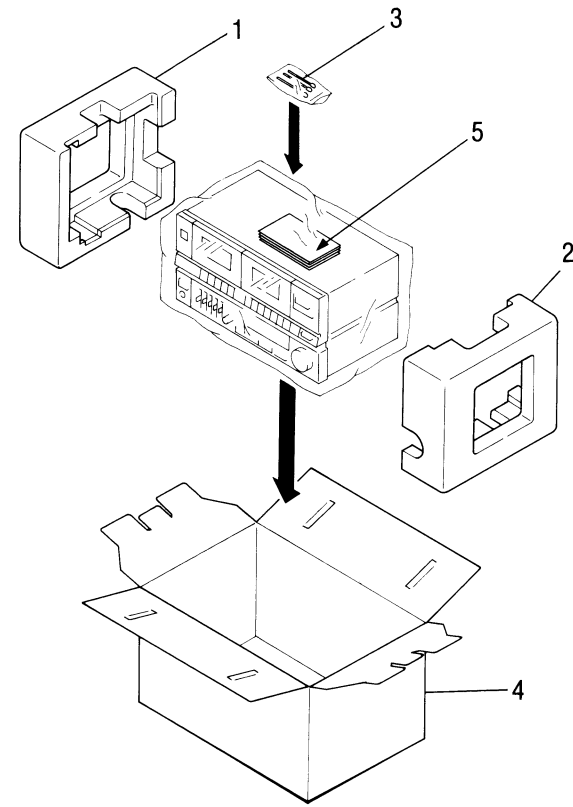
1. Disconn
2. Remove
3. Change
primary
220V: D
ho
po
no
te
240V: D
ho
po
no
te
4. Stick the

Descripti
220V labe
240V labe

7. PACKING

Convert the resistance value
write the part no. as before.

Part No.
ACN-209



Mark	No.	Part No.	Description
	1	AHA-395	Side pad L
	2	AHA-396	Side pad R
	3	AEX-016	Head swab
	4	AHE-471	Packing case for DC-X21Z
		AHE-470	Packing case for DC-X20Z
	5	ARB-644 (HB type)	Operating instructions (English)
		ARE-126 (HE type)	Operating instructions (English/German/French/Italian)

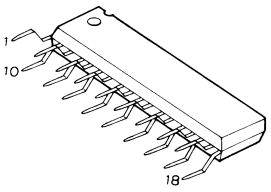
Line Voltage Selection for HE and HB Types

1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Change the connection of the power transformer primary lead wire as follows:
220V: Disconnect the terminal no.2 on the fuse holder assembly to the terminal no.8 of the power transformer, and connect the terminal no.2 on the fuse holder assembly to the terminal no.6 of the power transformer.
240V: Disconnect the terminal no.2 on the fuse holder assembly to the terminal no.6 of the power transformer, and connect the terminal no.2 on the fuse holder assembly to the terminal no.8 of the power transformer.
4. Stick the line voltage label on the rear panel.

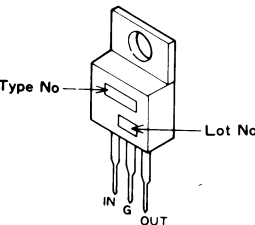
Description	Part No.
220V label	AAX-193
240V label	AAX-192

External Appearance of Transistors and ICs

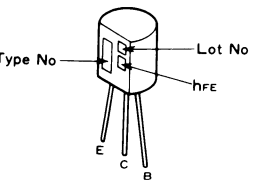
BA3812L



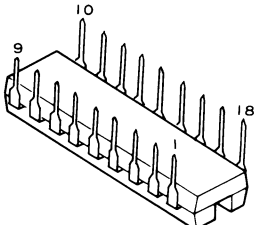
μPC78M12H



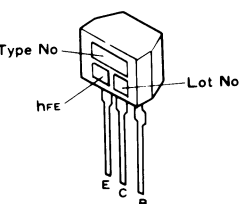
2SC2878



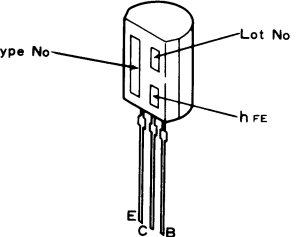
HA12045



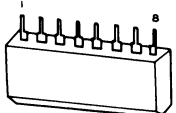
2SA933S
2SC1740S



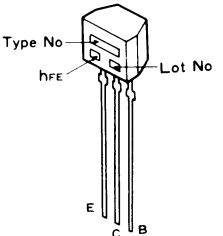
2SD438



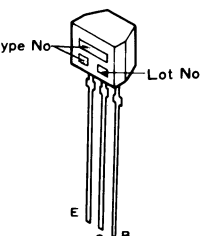
M5218L
M5220L



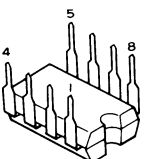
2SA1048
2SC2458



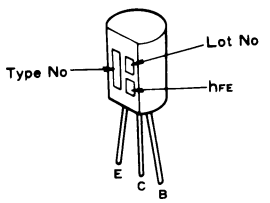
DTA124ES
DTA143ES
DTC124ES
DTC143ES



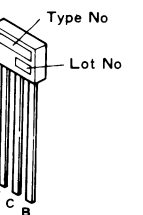
M5218P



2SB560



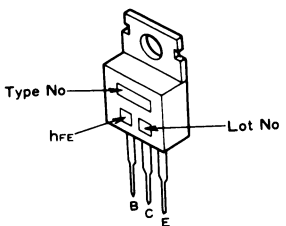
RN1201
RN1203
RN2201
RN2203



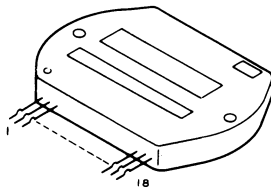
TA7341P



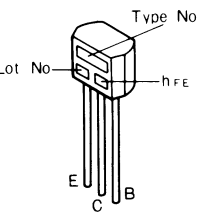
2SB834



STK4171-2S



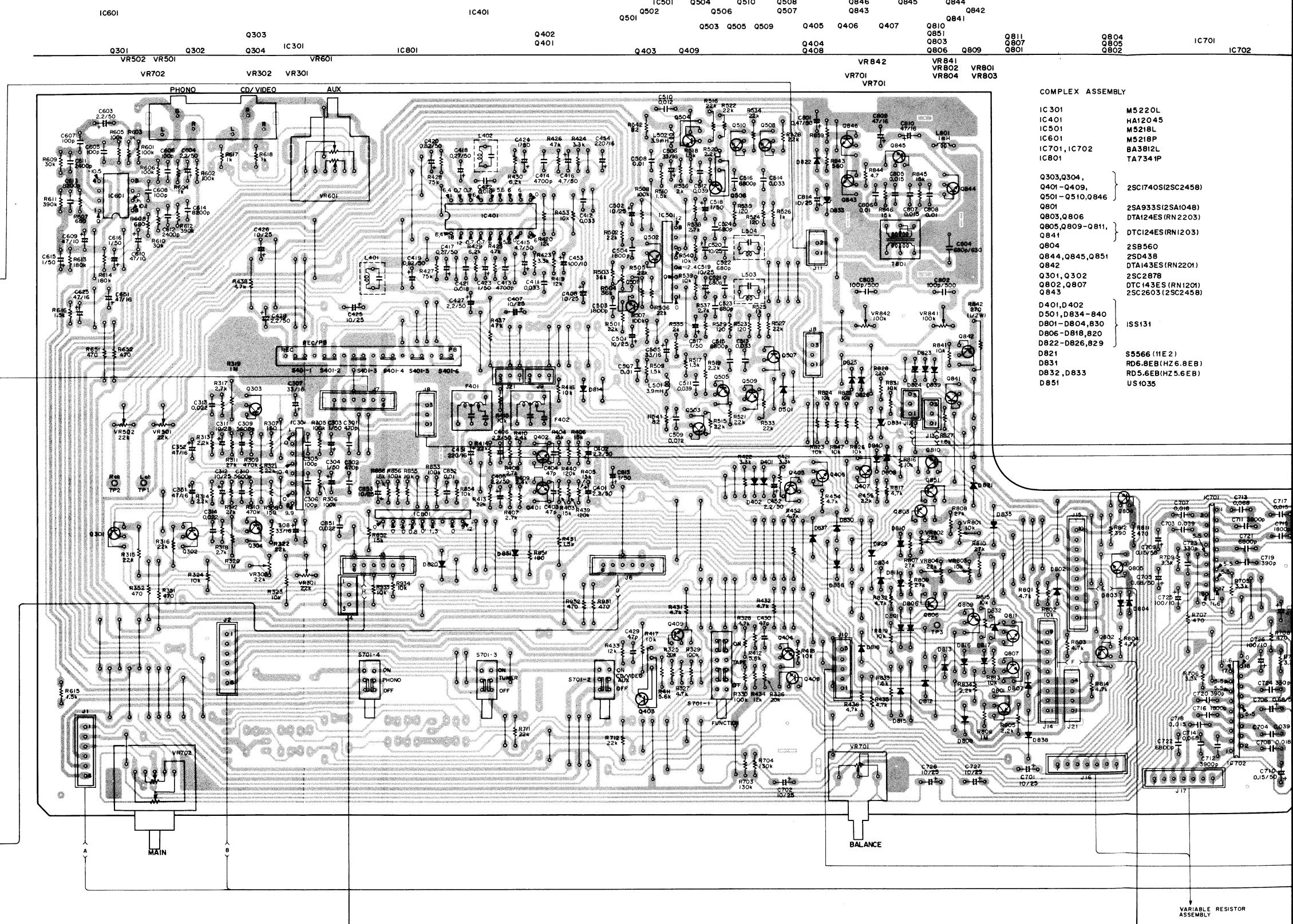
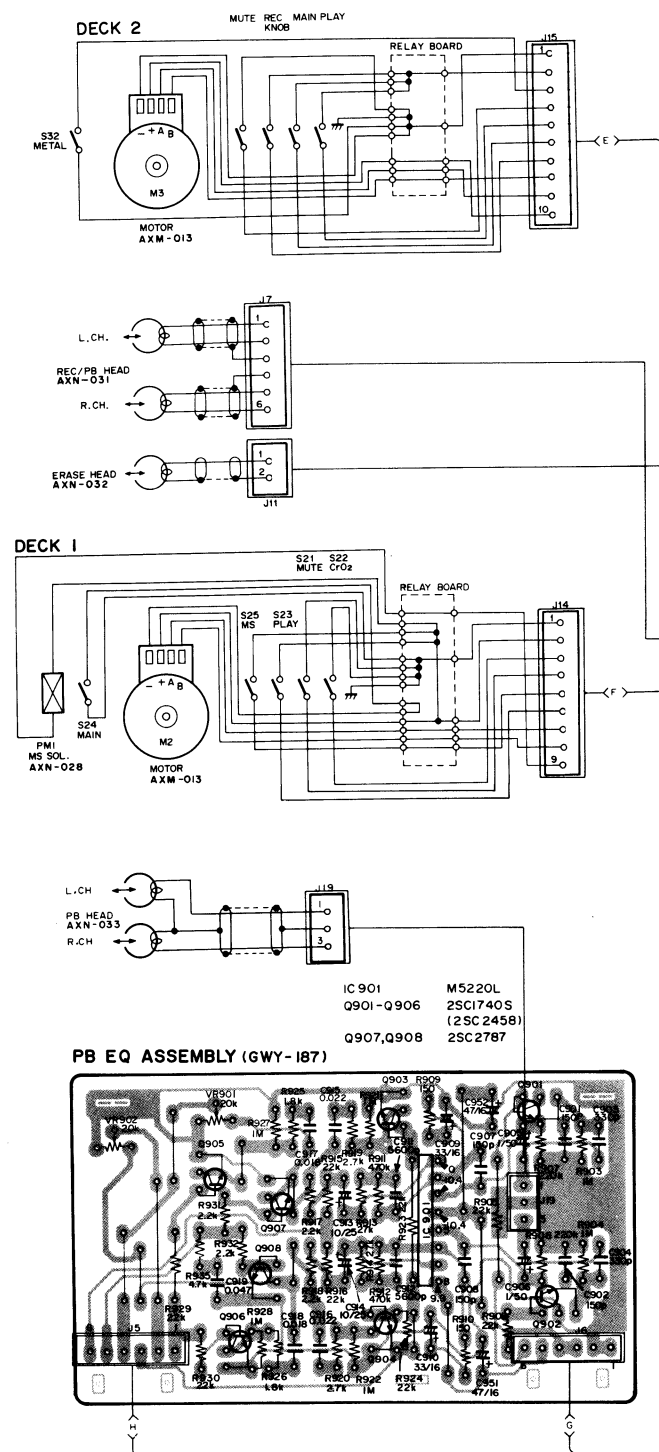
2SC2603



8. P.C. BOARDS CONNECTION DIAGRAM

A

COMPLEX ASSEMBLY (GWM-398)



1811
8807
0801

Q804
Q805
Q802

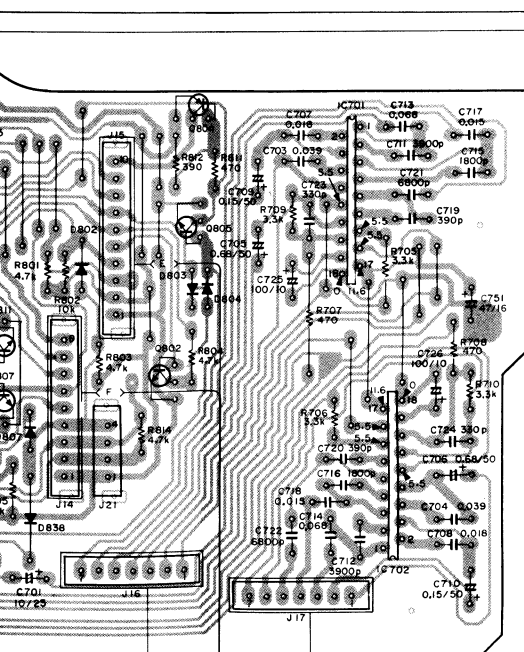
IC701
IC702

COMPLEX ASSEMBLY

IC301 M5220L
IC401 HA12045
IC501 M5218L
IC601 M5218P
IC701, IC702 BA3812L
IC801 TA7341P

Q303, Q304, Q401-Q409, Q501-Q510, Q846 Q801, Q803, Q806, Q805, Q809-Q811, Q844 2SC1740S(2SC245B)
Q804 2SA933S(2SA104B)
Q844, Q845, Q851 2SD438
Q842 DTA143ES(RN2201)
Q301, Q302 2SC2878
Q802, Q807 DTC143ES(RN1201)
Q843 2SC2603(2SC245B)

D401, D402 D501, D834-840 D801-D804, D830 D806-D818, D820 D822-D826, D829 D821 D831 D832, D833 D851 ISS131
S5566(11E2)
RD6.8EB(HZ6.8EB)
RD5.6EB(HZ5.6EB)
US1035



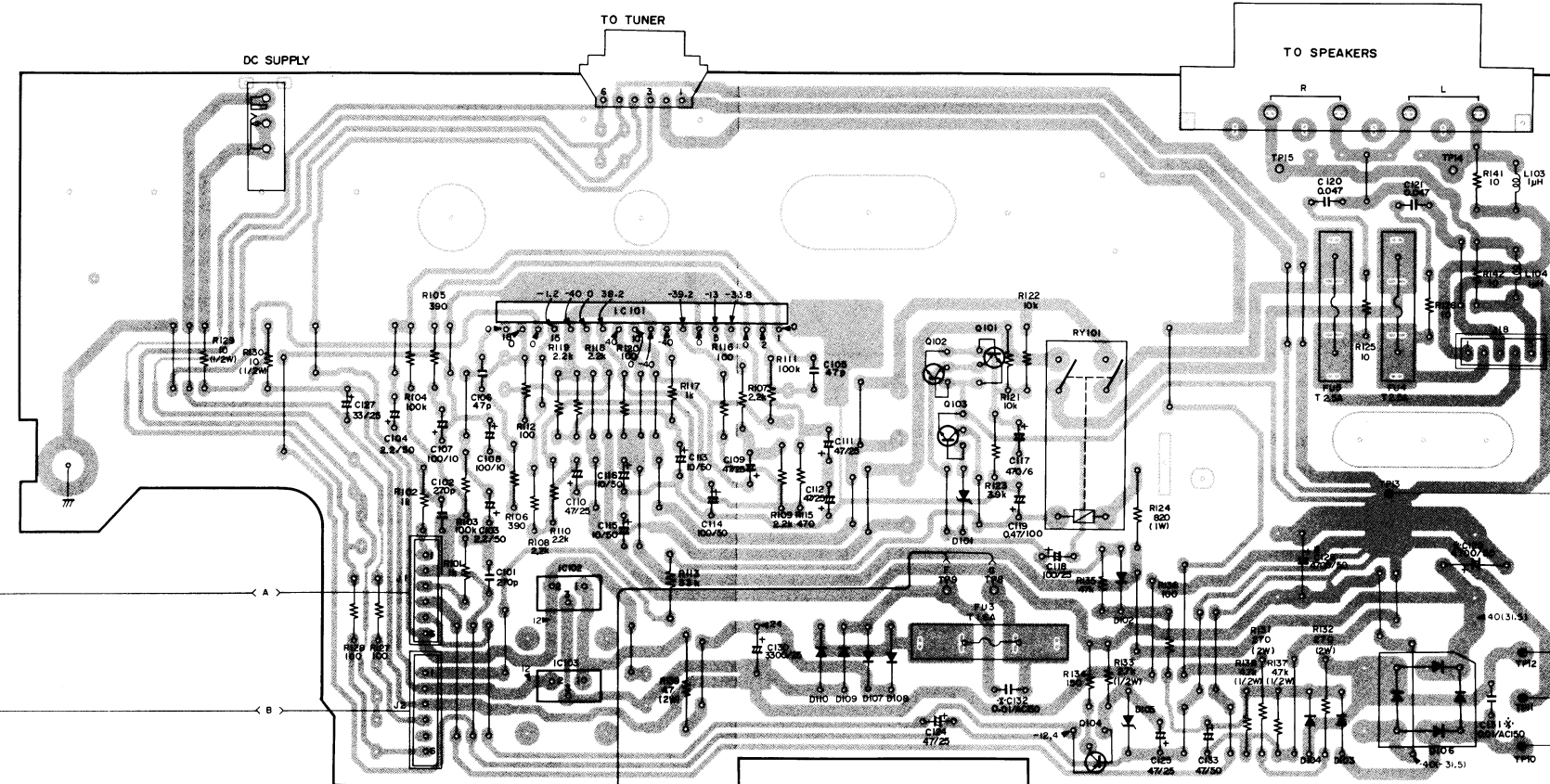
VARIABLE RESISTOR ASSEMBLY

POWER AMP ASSEMBLY (GWH-178)

IC101
IC102
IC103

Q102 Q101
Q103

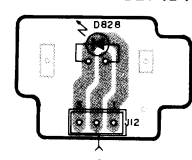
Q104



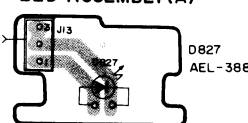
POWER AMP ASSEMBLY

IC101 STK4171-2S
IC102, IC103 μ PC78M12H
Q101-Q103 2SC1740S(2SC2603)
Q104 2SB834
D101 KZL150
D102 IS2471
D103, D104, D107-D110 S5566(11E2)
D105 RD13EB(HZ13EB)
D106 RB402

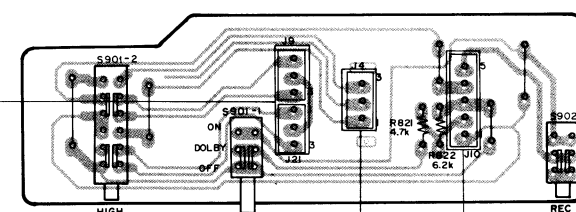
LED ASSEMBLY (B)



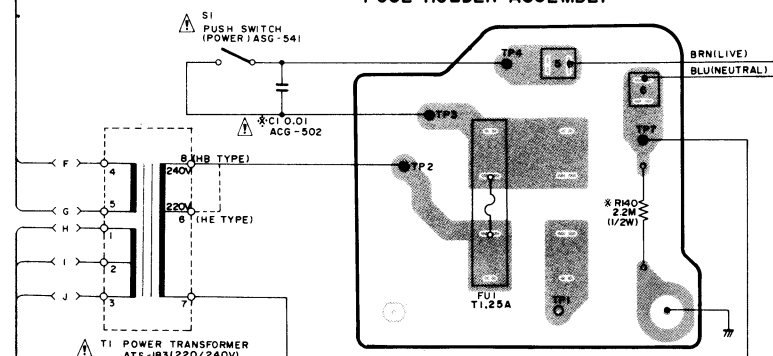
LED ASSEMBLY (A)



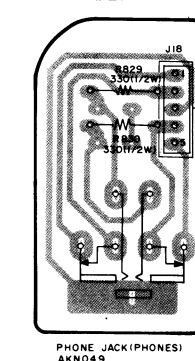
SWITCH ASSEMBLY



FUSE HOLDER ASSEMBLY

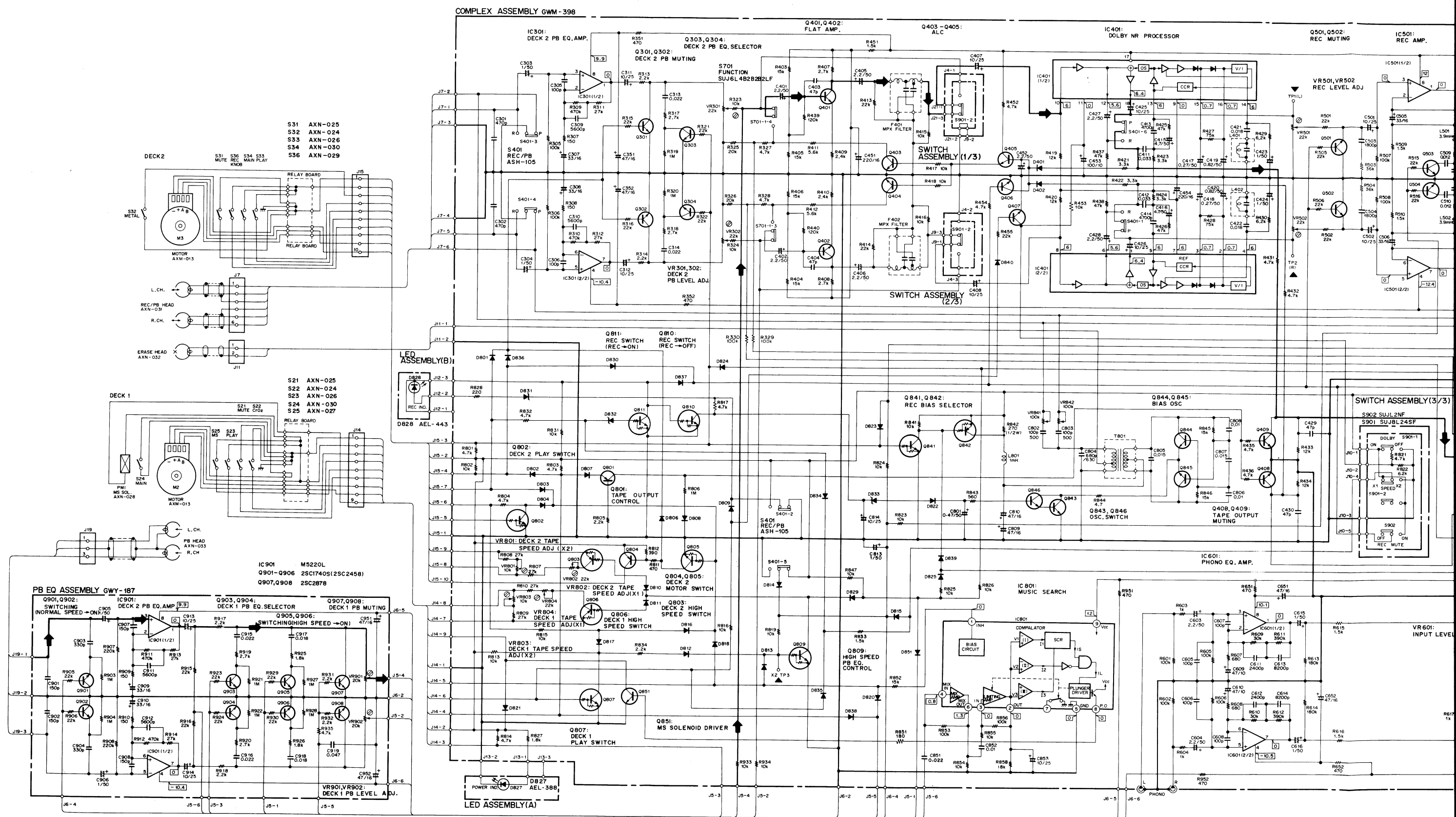


HEADPHONE JACK ASSEMBLY

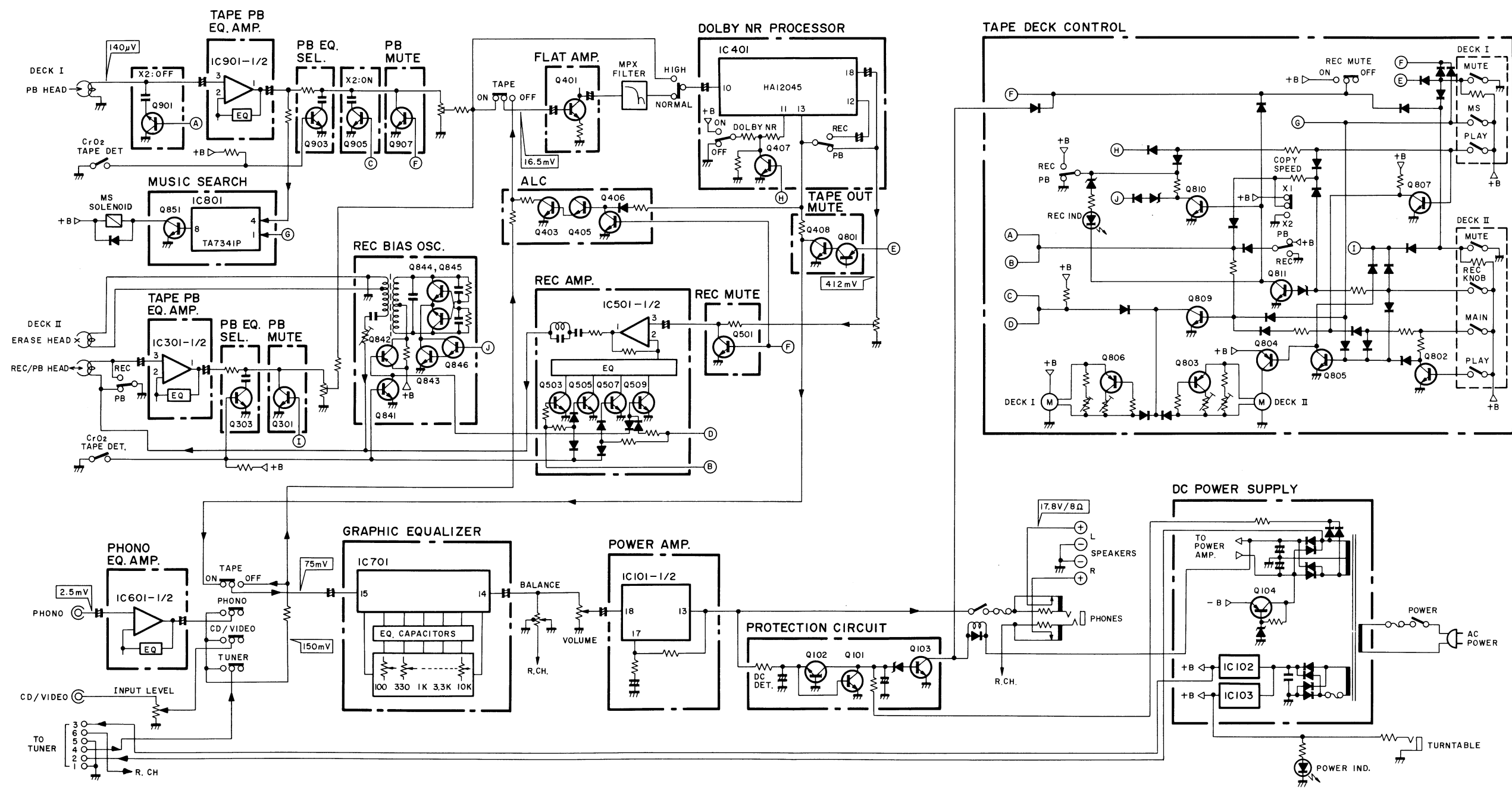


AC POWER CORD
ADG-068(HE TYPE)
ADG-063(HE TYPE)

7



10. BLOCK DIAGRAM



11. CIRCUIT

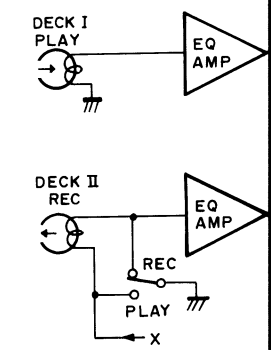
The DC-X21Z (DC-X20Z) incorporates double exclusive playback unit (Deck I and Deck II).

11-1. Cassette Tape DOLBY NR Section

The DOLBY NR section incorporates Type B DOLBY NR for L and R channels. During the COPY mode, the DOLBY NR is set to REC, independent of the DOLBY NR signals of Deck I and Deck II, being DOLBY NR de

MS (Music Search)

Music interval detection section. When Deck I is in operation, the INH starts the music interval playback signals due to specified time length, terminal. Due to the operated to turn M mode.



11. CIRCUIT DESCRIPTIONS

The DC-X21Z (DC-X20Z) is a stereo amplifier which incorporates double cassette tape decks, namely; an exclusive playback unit (Deck I) and a recording and playback unit (Deck II).

11-1. Cassette Tape Deck Section

DOLBY NR Section

The DOLBY NR section employs HA12045 which incorporates Type B DOLBY NR Encoder/Decoder in its L and R channels.

During the COPY mode (Deck I is set to PLAY and Deck II is set to REC), the DOLBY NR operation stops independent of the DOLBY NR switch, and the playback signals of Deck I are recorded into the Deck II without being DOLBY NR decoded or encoded. (Fig. 11-1)

MS (Music Search) Section

Music interval detecting IC TA7341P is used in the MS section. When Deck I becomes into MS mode (CUE operation), the INH terminal becomes H level, and it starts the music interval detection operation. When the playback signals due to CUE operation are stopped for a specified time length, pulse signal is output from the P0 terminal. Due to this pulse signal, MS solenoid is operated to turn MECHANICAL mode into PLAY mode.

Automatic Tape Selector

The automatic tape selector is designed for both metal tape and normal tape uses by detecting the CrO₂ tape discrimination hole of the cassette half, and it enables to perform simultaneous switching of both record/playback equalizers and recording bias.

Accordingly, when CrO₂ tape is used in playback, no particular problems will occur; however, when recording, the frequency characteristics tend to become over-bias. This results in much reduction of frequency characteristics in the higher ranges.

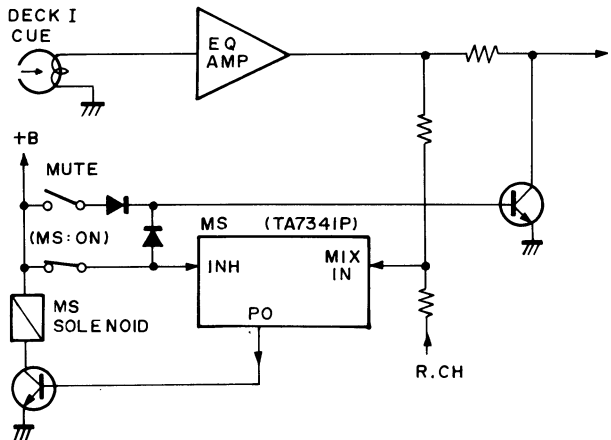


Fig. 11-2 Music Search circuit

11-2. Integrated Amplifier Section

Phono Equalizer Amplifier

It uses a low noise operation amplifier IC (M5218P).

Graphic Equalizer Section

In order to vary the frequency characteristics, it provides five resonance circuits (to obtain equalized inductance by the transistors) in the feedback loop of the operation amplifier, and creates five poles in its playback signal frequency band.

In each of these circuits, IC (BA3812L) is used. The IC (BA3812L) forms a five-pole graphic equalizer by adding a capacitor for resonance circuit and a variable resistor to it.

Power Amplifier Section

It uses IC (STK4171-2S) which incorporates a power amplifier for 2 channels and gains of 40W×2 THD 0.3% at 1 kHz.

Protection Circuit

It uses a relay to switch the output circuit of the power amplifier ON and OFF, and prevents the transient noise output due to cutoff by the DC voltage detection at the center of the output, and the delayed connection when the power is turned ON and cutoff when the power is turned OFF.

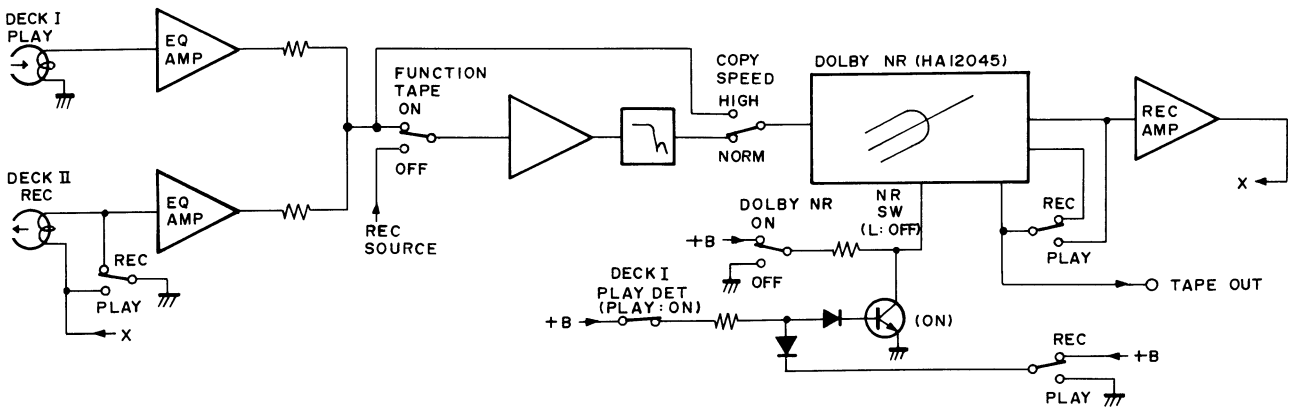


Fig. 11-1 Signal route in COPY mode

12. ADJUSTMENTS

12-1. MECHANICAL ADJUSTMENTS

Prior to Adjustment

Clean the both reel base, the capstan and the pinch roller with an alcohol moistened swab.

Pinch Roller Pressure Adjustment

1. Put the deck in to the play back mode.
2. Gently push against the pinch roller arm with the tension gauge and separate the pinch roller slightly from the capstan.
3. Then the pinch roller back onto the capstan, and read the value when the pinch roller starts to rotate. If the reading fails to lie within 300 — 500g, replace the pinch roller pressure spring.

Reel Base Torque Check

Measure the torque with the torque meter during playback, fast forward (FF) and rewind (REW) modes. The measured values should normally lie within the allowable ranges listed in the table 1.

If the measured values lie outside the relevant ranges, replace the T reel assembly, and/or S reel assembly or P idler assembly.

Table 1

	T reel base (R side)	S reel base (L side)
PLAY mode	35g·cm — 70g·cm	*1g·cm — 5g·cm
FF mode	70g·cm — 140g·cm	*1g·cm — 5g·cm
REW mode	*1g·cm — 5g·cm	70g·cm — 140g·cm

*back-tension torque

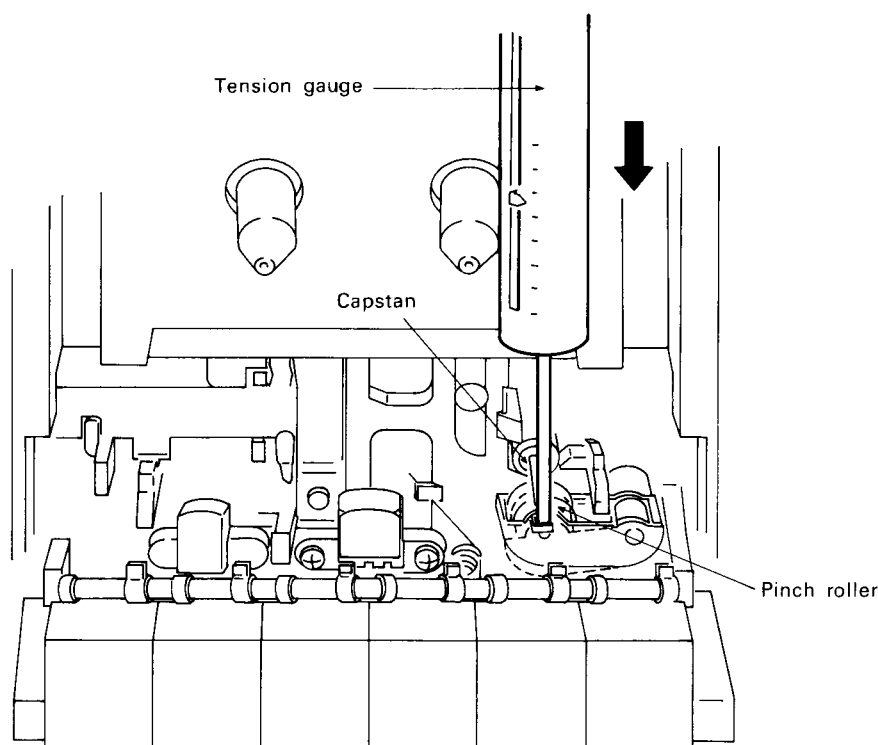


Fig. 12-1 Pressure adjustment of pinch roller

Tape Speed Adjustment

1. Connect the frequency counter to the TP1 terminal on the complex assembly.
2. Set the TAPE switch to the ON position.
3. Load the STD-301 test tape into the deck I.
4. Short circuit the TP3 (×2) terminal on the complex assembly, and play the STD-301 test tape at double speed.
5. Check that the deck I playback signal frequency is $6020\text{Hz} \pm 10\text{Hz}$. If the frequency reading lies outside this range, adjust VR803 to obtain the $6020\text{Hz} \pm 10\text{Hz}$.
6. Open circuit the TP3 (×2) terminal.
7. Play the STD-301 test tape, and check that the deck I playback signal frequency is $3010\text{Hz} \pm 5\text{Hz}$. If the frequency reading lies outside this range, adjust VR804 to obtain the $3010\text{Hz} \pm 5\text{Hz}$.
8. Load the STD-301 test tape into the deck II.
9. Short circuit the TP3 (×2) terminal, and play the STD-301 test tape at double speed.
10. Adjust VR801 to obtain a double speed playback frequency reading within $\pm 20\text{Hz}$ of the deck I reading.
11. Open circuit the TP3 (×2) terminal, and play the STD-301 test tape.
12. Adjust VR802 to obtain playback frequency reading within ± 10 of the deck I reading.

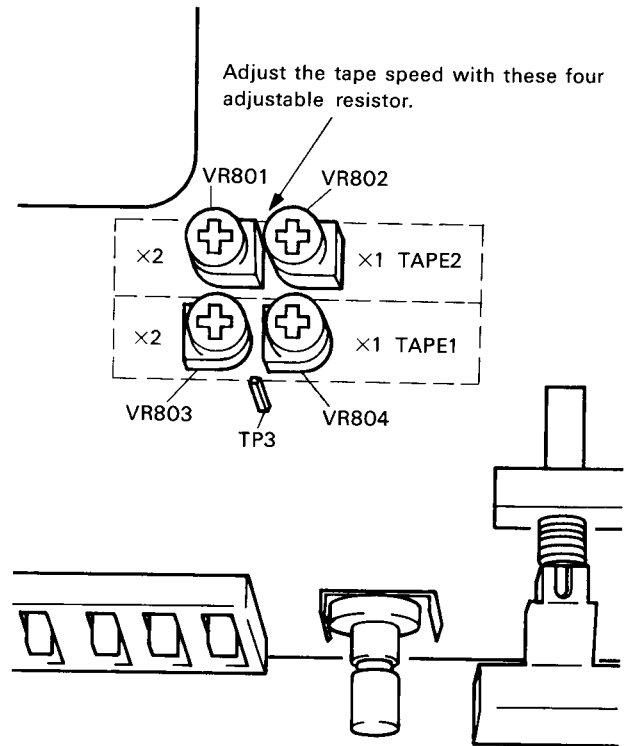


Fig. 12-2 Arrangement diagram of adjusting parts

REC Joint Check

1. Check that the slide switch is fully switched when the tape transport unit 2 (deck II) is in the recording mode.
2. Move the REC joint mechanism catching position if the slide switch is not fully switched.

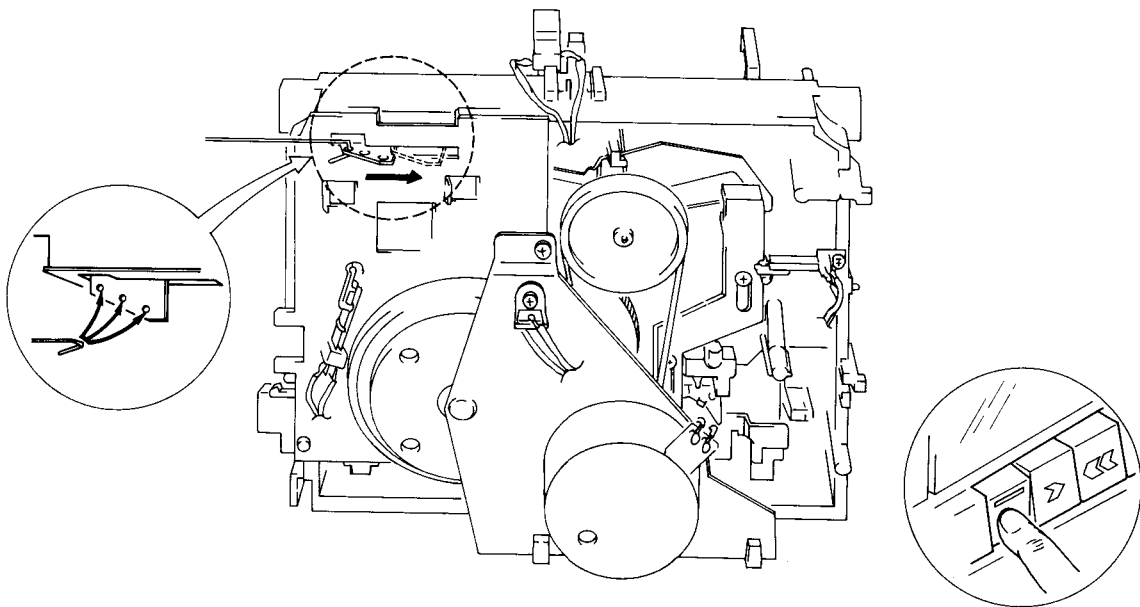


Fig. 12-3 REC joint adjustment

12-2. ELECTRICAL ADJUSTMENTS

■ **Before commencing any electrical adjustments, make sure the following checked/completed.**

1. All mechanical adjustments must have been completed.
2. The heads must be clean and demagnetized.
3. 0 dB=1V during level measurements.
4. Use the specified tapes for each adjustment.
Although test tapes have both A and B sides, only use side A where the label is attached.
STD-331B: Playback adjustment
STD-608A: NORMAL blank tape
STD-603: CrO₂ blank tape
STD-610: METAL blank tape
5. Prepare the following measuring equipment.
AC millivoltmeter, audio generator, attenuator, oscilloscope.
6. Adjust both left and right channels unless otherwise specified.
7. And unless indicated otherwise, leave the DOLBY NR switch in the OFF position.

8. Let the set warm up for at least a few minutes before commencing adjustments. And before commencing the record/playback frequency response adjustment, let the set "age" for three to five minutes.
9. Always adjust the set in the given adjustments order. If the order is changed, proper adjustment will not be possible, and this may result in loss of performance.

Adjustment Procedure

Deck I

1. Head azimuth adjustment
2. Playback level adjustment

Deck II

1. Head azimuth adjustment
2. Playback level adjustment
3. Recording/Playback frequency response
4. Recording level adjustment

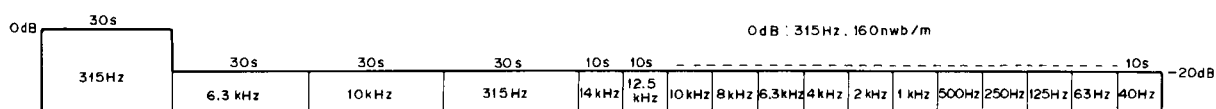


Fig. 12-4 Test tape STD-331B

• DECK I ADJUSTMENT (with auto tape selector function)

1. Head Azimuth Adjustment • Set VR901 and VR902 (playback level adjustment) to MAX positions (turn fully clockwise)

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	PLAY	Play 10kHz—20dB portion of STD-331B test tape.	Head azimuth adjustment screw. (Fig. 12-6)	TP1 (L) TP2 (R)	Maximum playback signal level.	Apply "screw-lock" after completing adjustment.

2. Playback Level Adjustment • Adjust precisely since this adjustment sets the playback Dolby level.

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	PLAY	Play the 315Hz 0dB portion of the STD-331B test tape.	VR901 (L) VR902 (R)	TP1 (L) TP2 (R)	-7.7dBv (412mV)	

• DECK II ADJUSTMENT (with auto tape selector function)

1. Head Azimuth Adjustment • Set VR301 and VR302 (playback level adjustment) to MAX positions (turn fully clockwise)

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	PLAY	Play 10kHz—20dB portion of STD-331B test tape.	Head azimuth adjustment screw. (Fig. 12-6)	TP1 (L) TP2 (R)	Maximum playback signal level.	Apply "screw-lock" after completing adjustment.

2. Playback Level Adjustment • Adjust precisely since this adjustment sets the playback Dolby level.

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	PLAY	Play the 315 Hz 0dB portion of the STD-331B test tape.	VR301 (L) VR302 (R)	TP1 (L) TP2 (R)	-7.7dBv (412mV)	

3. Recording/Playback Frequency Response Adjustment

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	REC	Apply a 315Hz signal to the CD/VIDEO terminals. Set the CD/VIDEO switch to ON.	1 Input signal level to be applied to the CD/VIDEO terminals.	TP1 (L) TP2 (R)	-27.7dBv (41mV)	Set the INPUT level control to the maximum position (rear panel).
NORM	REC/PLAY	Record 315Hz and 6.3kHz signals on the STD-608A test tape, and then playback signals.	2 VR841 (L) VR842 (R)	TP1 (L) TP2 (R)	Repeat the recording and playback processes and adjust accordingly until the 6.3kHz playback level is within $0 \pm 0.5\text{dB}$ of the 315Hz level.	

- Change the test tape and the DOLBY NR switch position and check that the frequency response zone indicated in Fig. 12-8, 9 is satisfied.

4. Recording Level Adjustment

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	REC	Apply a 315Hz signal to the CD/VIDEO terminals. Set the CD/VIDEO switch to ON.	1 Input signal level to be applied to the CD/VIDEO terminals.	TP1 (L) TP2 (R)	-7.7dBv (412mV)	Set the INPUT level control to the maximum position (rear panel).
NORM	REC/PLAY	Record the 315Hz signal onto the STD-608A test tape, and then play the signal back.	2 VR501 (L) VR502 (R)	TP1 (L) TP2 (R)	Repeat the recording the playback processes, and adjust accordingly until a playback level of -7.7dBv (412mV) is obtained.	
METAL	REC/PLAY	Record the 315Hz signal onto the STD-610 test tape, and then play the signal back.	3	TP1 (L) TP2 (R)	Check that the 315Hz playback level is $-7.7\text{dBv} \pm 1.5\text{dB}$.	

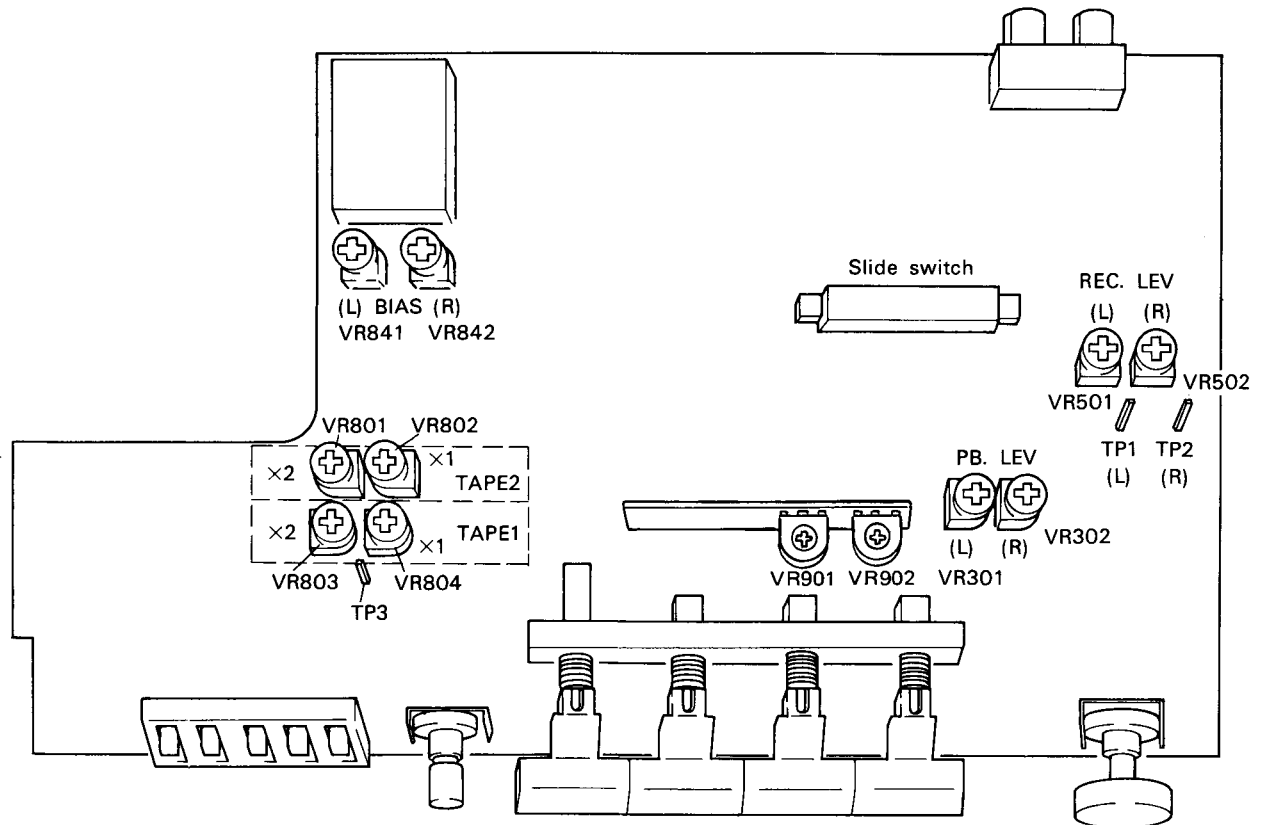


Fig. 12-5 Arrangement diagram of adjusting parts

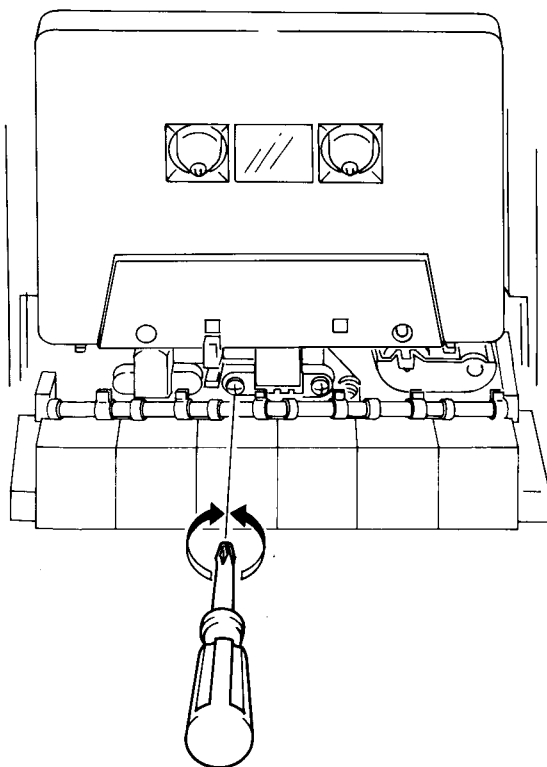


Fig. 12-6 Head azimuth adjustment

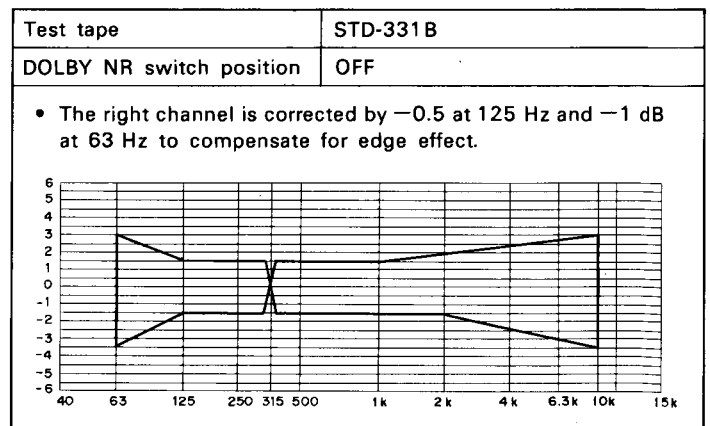


Fig. 12-7 Playback frequency response tolerance zone

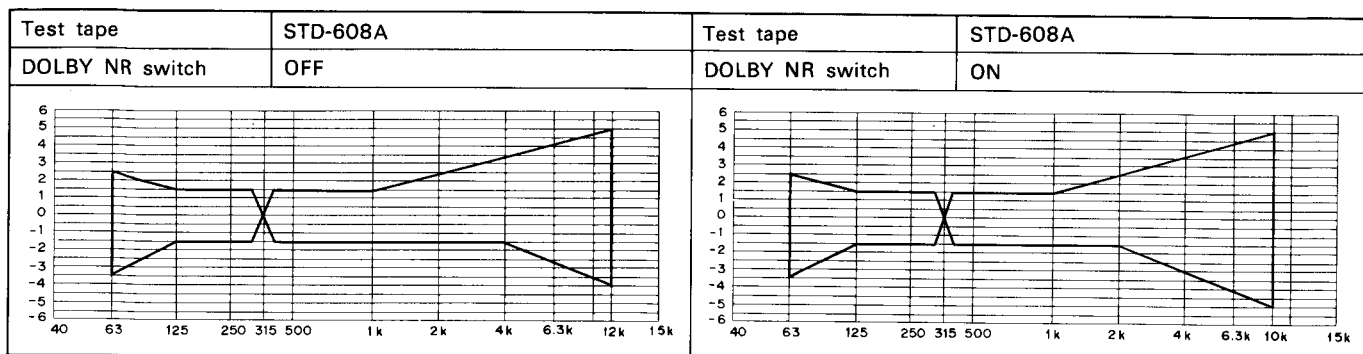


Fig. 12-8 Recording & playback frequency response tolerance zone (NORM)

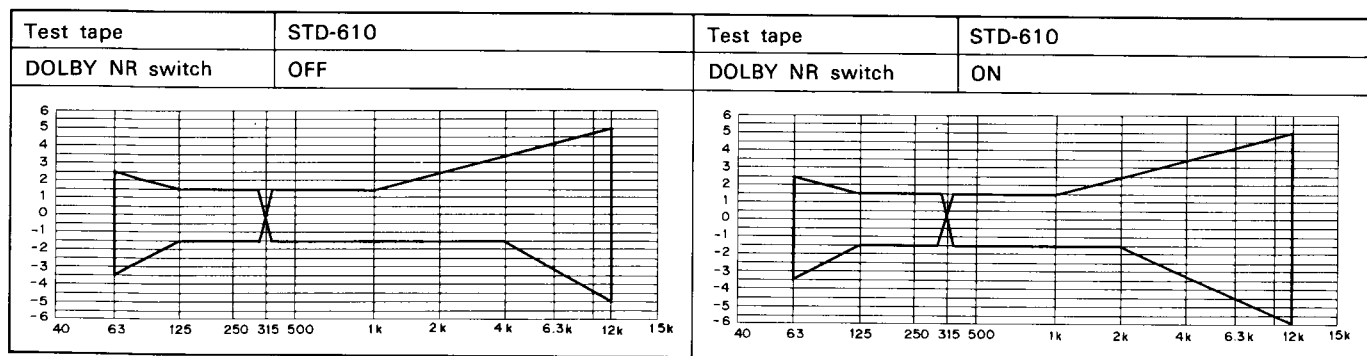


Fig. 12-9 Recording & playback frequency response tolerance zone (METAL)

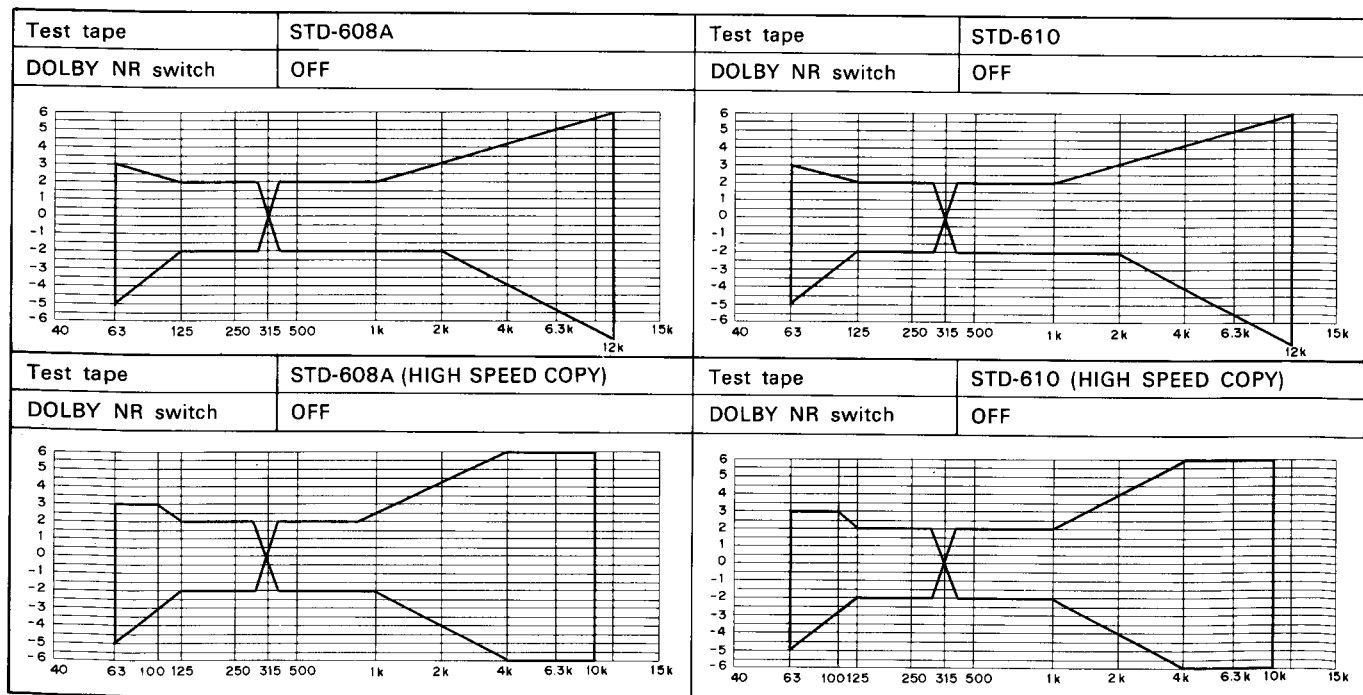


Fig. 12-10 Copy mode recording & playback frequency response (for reference purposes)

12. RÉGLAGE

12-1. RÉGLAGES MECANQUES

Avant le réglage

Nettoyer les deux embases de bobine, le cabestan et le rouleau presseur avec un tissu imbibé d'alcool.

Réglage du rouleau presseur

1. Placer la platine en mode play back (lecture).
2. Pousser doucement la jauge de tension contre le bras du rouleau presseur et séparer légèrement le rouleau presseur du cabestan.
3. Puis, replacer le rouleau presseur contre le cabestan, et lire la valeur indiquée lorsque le rouleau presseur se met à tourner. Si la lecture est dans la plage 300 — 500g, remplacer le ressort du rouleau presseur.

Vérification du couple d'embase de bobine

Mesurer le couple torsiomètre en modes, lecture, avance rapide (FF) et rembobinage (REW). Les valeurs mesurées devraient être comprises dans les plages indiquées dans le Tableau 1.

Si les valeurs mesurées ne sont pas comprises dans ces plages, remplacer le montage de bobine T, et/ou le montage de bobine S ou le montage de poulie intermédiaire P.

Tableau 1

	Embase de bobine T (côté droit)	Embase de bobine S (côté gauche)
Mode PLAY	35g · cm—70g · cm	*1g · cm—5g · cm
Mode FF	70g · cm—140g · cm	*1g · cm—5g · cm
Mode REW	*1g · cm—5g · cm	70g · cm—140g · cm

* Couple tension arrière

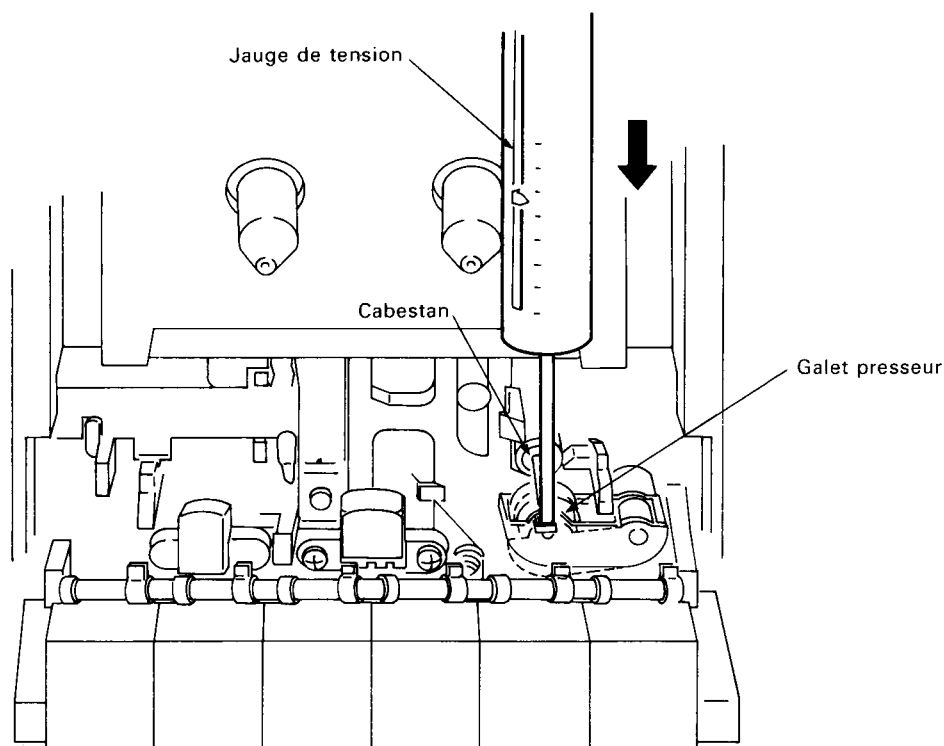


Fig. 12-1 Réglage du rouleau presseur

Réglage de la vitesse de la bande

1. Connecter le fréquencesmètre à la borne TP1 de l'ensemble.
2. Régler le commutateur TAPE en position ON.
3. Placer la bande-test STD-301 sur la platine I.
4. Court-circuiter la borne TP3 (×2) de l'ensemble complexe, et faire passer la bande test STD-301 à double vitesse.
5. Vérifier si la fréquence de signal de lecture de la platine I est de $6020 \text{ Hz} \pm 10 \text{ Hz}$. Si la fréquence lue est en dehors de cette marge, régler VR803 de manière à obtenir cette lecture.
6. Mettre la borne TP3 (×2) en circuit ouvert.
7. Faire passer la bande test STD-301, et vérifier si la fréquence de signal de lecture de la platine I est de $3010 \text{ Hz} \pm 5 \text{ Hz}$. Si la fréquence lue est en dehors de cette marge, régler VR804 de manière à obtenir cette lecture.
8. Placer la bande test STD-301 sur la platine II.
9. Court-circuiter la borne TP3 (×2), et faire passer la bande test STD-301 à double vitesse.
10. Régler VR801 de manière à obtenir une lecture de fréquence à double vitesse dans la marge de $\pm 20 \text{ Hz}$ dans la lecture de la platine I.
11. Mettre la borne TP3 (×2) en circuit ouvert, et faire passer la bande test STD-301.
12. Régler VR802 de manière à obtenir une lecture de fréquence de lecture dans la marge de $\pm 10 \text{ Hz}$ dans la lecture de la platine I.

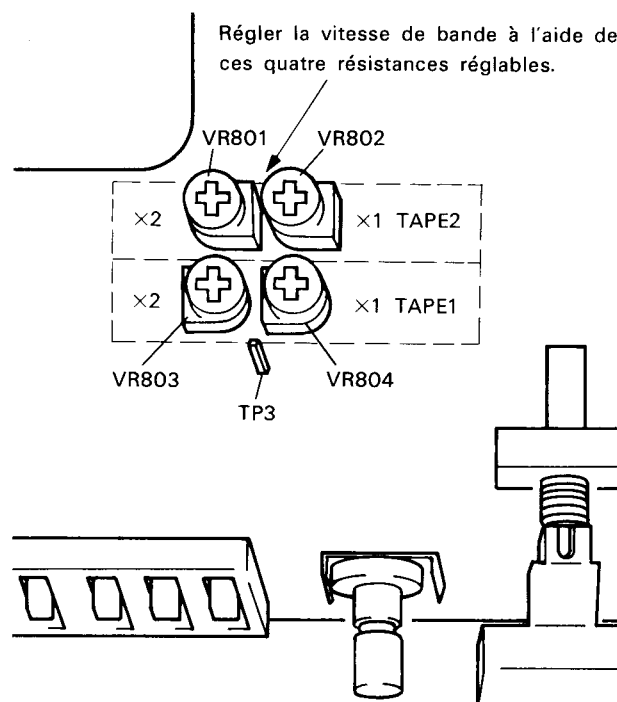


Fig. 12-2 Schéma de localisation des pièces de réglage

Platine combinée REC

1. Vérifier que le commutateur coulissant est correctement en contact lorsque l'unité 2 de transport (platine II) de bande est en mode enregistrement.
2. Déplacer la position de ride du mécanisme combiné REC si le commutateur coulissant n'est pas correctement en contact.

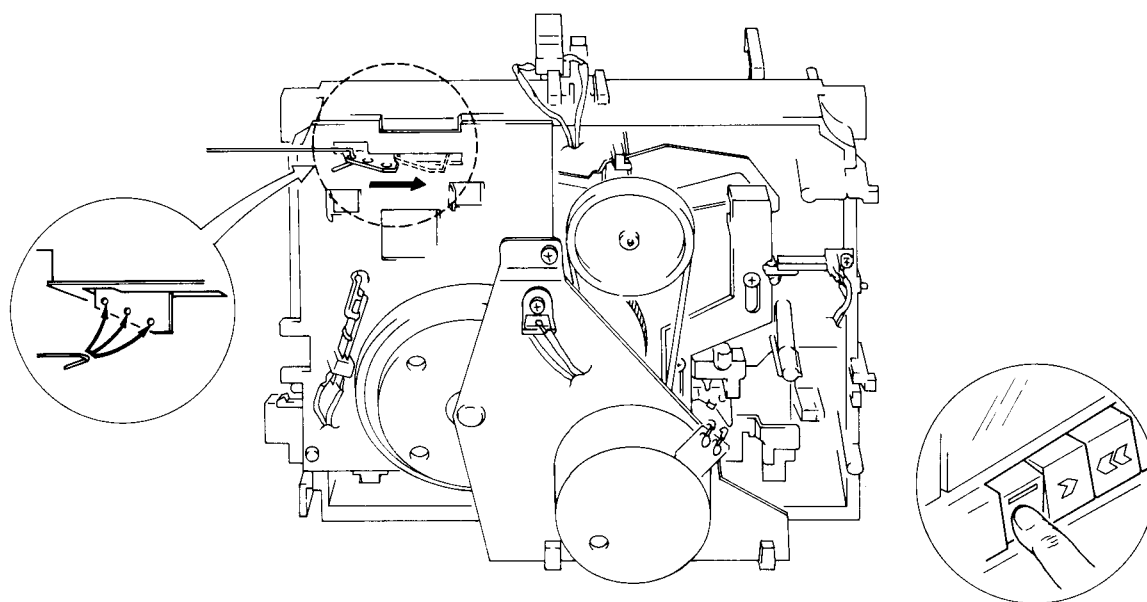


Fig. 12-3 Réglage mixte déenregistrement

12-2. RÉGLAGES ÉLECTRIQUES

■ Avant de commencer à procéder aux réglages électriques, bien effectuer les vérifications suivantes.

1. Tous les réglages mécaniques ont été effectués.
2. Les têtes doivent être propres et démagnétisées.
3. 0 dB=1V pendant les mesures de niveau.
4. Utiliser les bandes spécifiées pour chaque réglage. Bien que les bandes d'essai aient à la fois une face A et une face B, n'utiliser que la face A sur laquelle est attachée l'étiquette.
STD-331B: Réglage de la reproduction.
STD-608A: Bande vierge ordinaire.
(NORMAL)
STD-603: Bande vierge à l'oxyde de chrome (CrO₂)
STD-610: Bande vierge au métal (METAL)
5. Préparer les équipements de mesure ci-après: millivoltmètre CA, générateur audio, atténuateur, oscilloscope.
6. Régler à la fois le canal gauche et le canal droit, sauf spécification contraire.
7. Sauf spécification contraire, laisser le commutateur de réduction de bruit DOLBY en position arrêt (OFF).

8. Laisser l'appareil chauffer pendant au moins quelques minutes avant de commencer les réglages. Avant de commencer le réglage de la réponse en fréquences enregistrement/reproduction, laisser l'appareil fonctionner de trois à cinq minutes.
9. Toujours procéder aux réglages dans l'ordre indiqué. Si cet ordre est modifié, il ne sera plus possible d'effectuer des réglages correctement, et cela pourrait entraîner une dégradation des performances.

Procédure de réglage

Platine I

1. Réglage de l'azimutage de la tête.
2. Réglage du niveau de reproduction.

Platine II

1. Réglage de l'azimutage de la tête.
2. Réglage du niveau de reproduction.
3. Réponse en fréquences enregistrement/reproduction.
4. Réglage du niveau d'enregistrement.

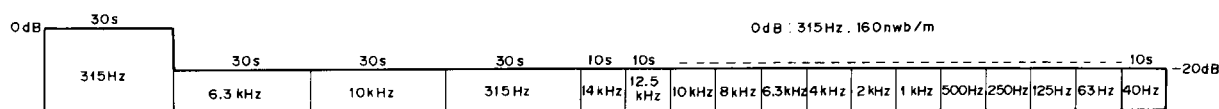


Fig. 12-4 Band d'essai STD-331B

• RÉGLAGE DE LA PLATINE I

(Avec sélecteur automatique de bande)

1. Réglage de l'azimutage de la tête

- Placer le VR901 et le VR902 (Réglage du niveau de reproduction) sur la position maximale MAX (tourner complètement dans le sens des aiguilles d'une montre).

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Reproduction (PLAY)	Reproduire la portion 10kHz -20dB de la bande d'essai STD-331 B.	Vis de réglage de l'azimutage de la tête. (Fig. 12-6)	TP1 (L) TP2 (R)	Niveau de signal de reproduction maximal.	Mettre en place "l'arrêt de vis" après avoir terminé ce réglage.

2. Réglage du niveau de reproduction

- Procéder à cet réglage avec précision car celui-ci détermine le niveau de reproduction du DOLBY.

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Reproduction (PLAY)	Reproduire la portion 315Hz 0dB de la bande d'essai STD-331 B.	VR901 gauche (L) VR902 droit (R)	TP1 (L) TP2 (R)	-7,7dB (412mV)	

• RÉGLAGE DE LA PLATINE II

(Avec sélecteur automatique de bande)

1. Réglage de l'azimutage de la tête

- Placer le VR301 et le VR302 (Réglage de niveau de reproduction) sur la position maximale (tourner complètement dans le sens des aiguilles d'une montre).

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Reproduction (PLAY)	Reproduire la portion 10kHz -20dB de la bande d'essai STD-331 B.	Vis de réglage de l'azimutage de la tête. (Fig. 12-6)	TP1 (L) TP2 (R)	Niveau de signal de reproduction maximal.	Mettre en place "l'arrêt de vis" après avoir effectué ce réglage.

2. Réglage du niveau de reproduction

- Procéder à ce réglage avec précision car celui-ci détermine le niveau de reproduction du DOLBY.

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Reproduction (PLAY)	Reproduire la portion 315Hz 0dB de la bande d'essai STD-331 B.	VR301 gauche (L) VR302 droit (R)	TP1 (L) TP2 (R)	-7,7dBv (412mV)	

3. Réglage de la réponse en fréquences d'enregistrement et de reproduction

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Enregistrement (REC)	Appliquer un signal 315Hz aux bornes CD/VIDEO. Mettez le commutateur CD/VIDEO sur ON.	1	TP1 (L) TP2 (R)	-27,7dBv (41mV)	Amener la commande de niveau INPUT sur la position maximale (panneau arrière).
Normal (NORM)	Enregistrement/reproduction (REC/PLAY)	Enregistrer des signaux de 315Hz et 6,3kHz sur la bande d'essai STD-608A, et reproduire ensuite les signaux.	2	VR841 gauche (L) VR842 droit (R)	TP1 (L) TP2 (R)	Recommencer les procédures d'enregistrement et de reproduction, et procéder au réglage en conséquence jusqu'à ce que le niveau de reproduction du 6,3kHz soit compris entre 0 ±0,5dB du niveau du 315Hz.

- Changer la bande d'essai et la position du commutateur de réducteur de bruit DOLBY, et vérifier que la courbe de réponse en fréquences indiquée sur la Fig. 12-8,9 est respectée.

4. Réglage du niveau d'enregistrement

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Enregistrement (REC)	Appliquer un signal 315Hz aux bornes CD/VIDEO. Mettez le commutateur CD/VIDEO sur ON.	1	TP1 (L) TP2 (R)	-7,7dBv (412mV)	Amener la commande de niveau INPUT sur la position maximale (panneau arrière).
Normal (NORM)	Enregistrement/reproduction (REC/PLAY)	Enregistrer le signal de 315Hz sur la bande d'essai STD-608A, puis reproduire le signal.	2	VR501 gauche (L) VR502 droit (R)	TP1 (L) TP2 (R)	Recommencer les procédures d'enregistrement et de reproduction, et procéder au réglage jusqu'à ce que un niveau de reproduction de -7,7dBv (412mV) soit obtenu.
Métal (METAL)	Enregistrement/reproduction (REC/PLAY)	Enregistrer le signal de 315Hz sur la bande d'essai STD-610, puis reproduire le signal.	3	TP1 (L) TP2 (R)		Vérifier que le niveau de reproduction du 315Hz est à -7,7dBv ± 1,5dB.

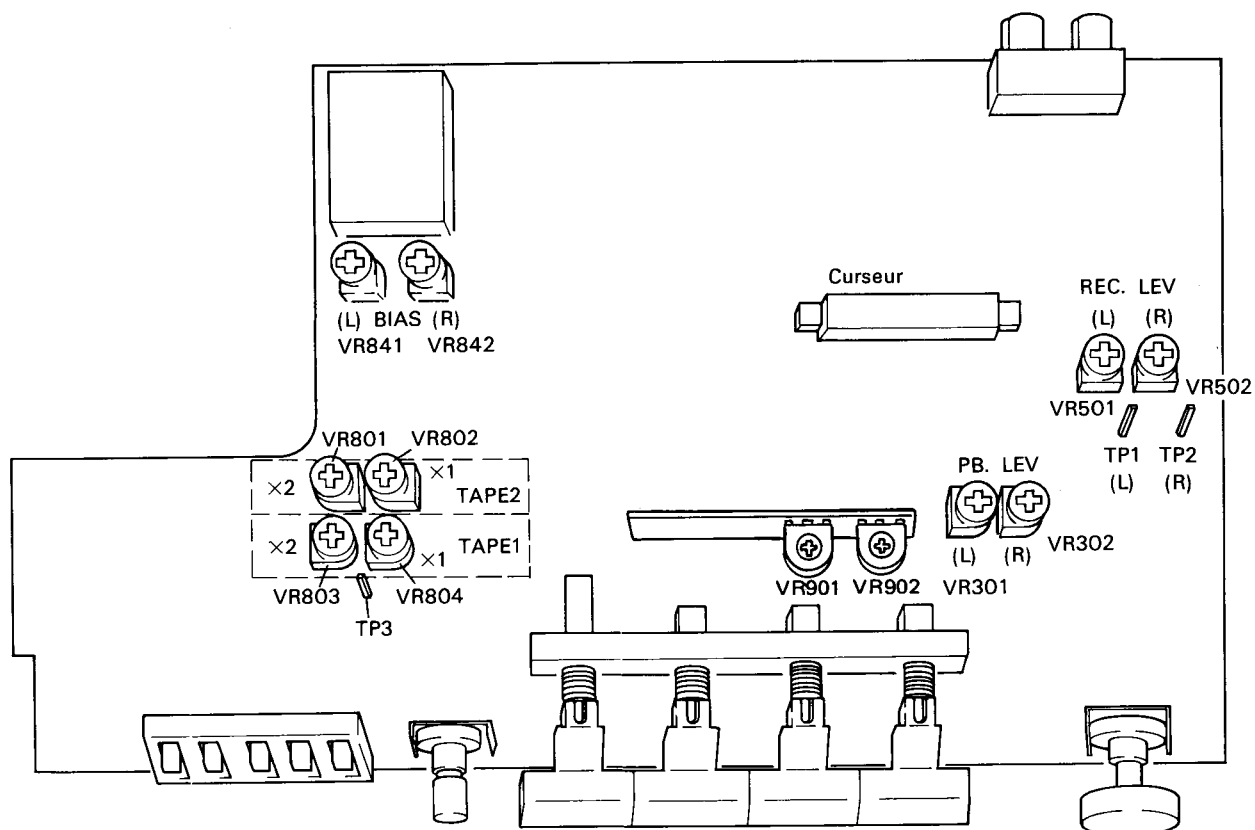


Fig. 12-5 Shéma de localisation des pièces de réglage

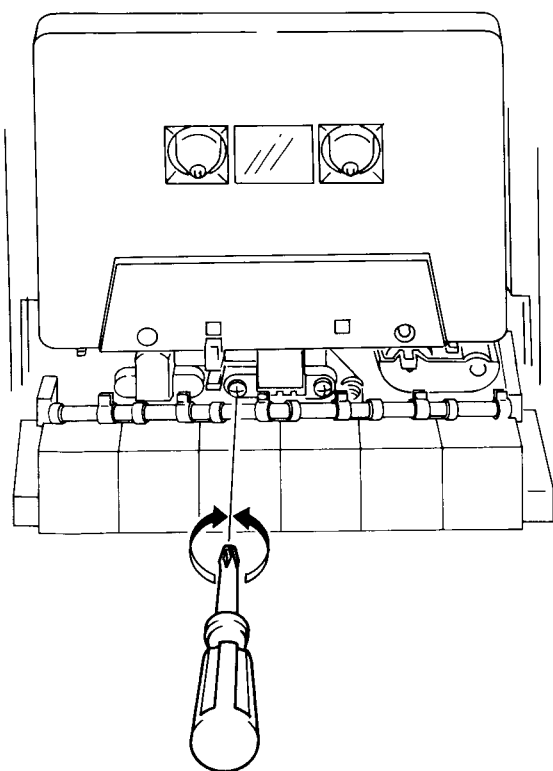


Fig. 12-6 Réglage d'azimuth de la tête

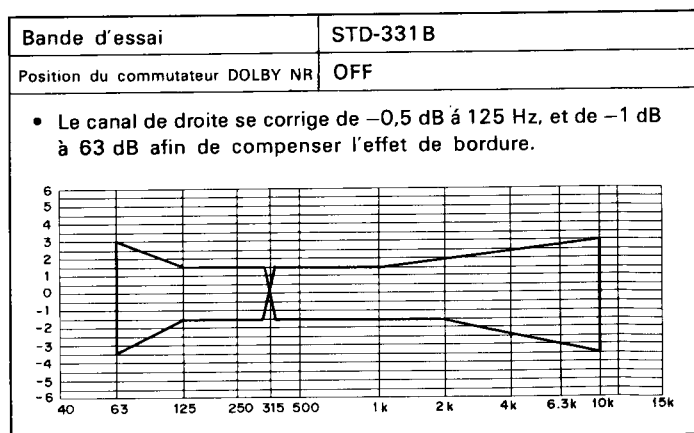


Fig. 12-7 Zone de tolérance de la réponse de fréquence de lecture

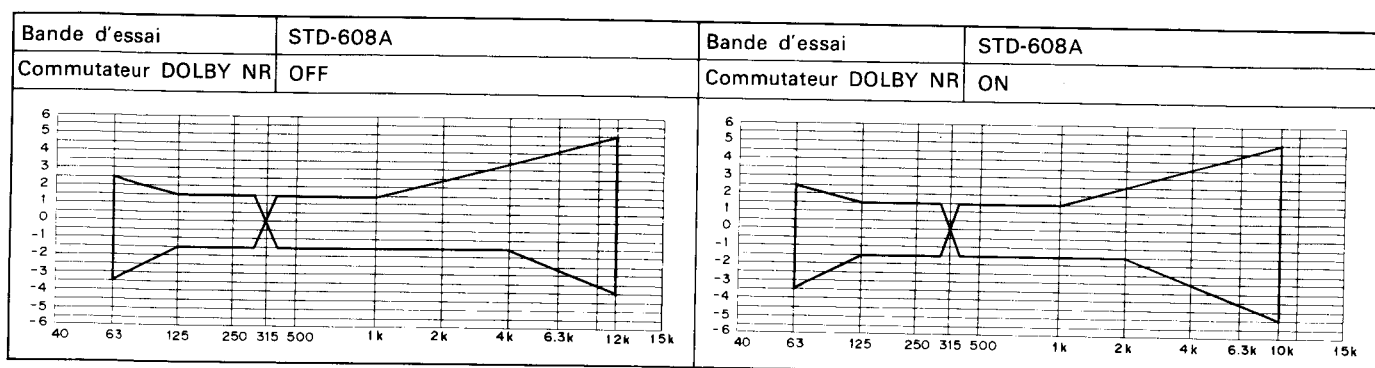


Fig. 12-8 Zone de tolérance de la réponse de fréquence d'enregistrement et de lecture (NORM)

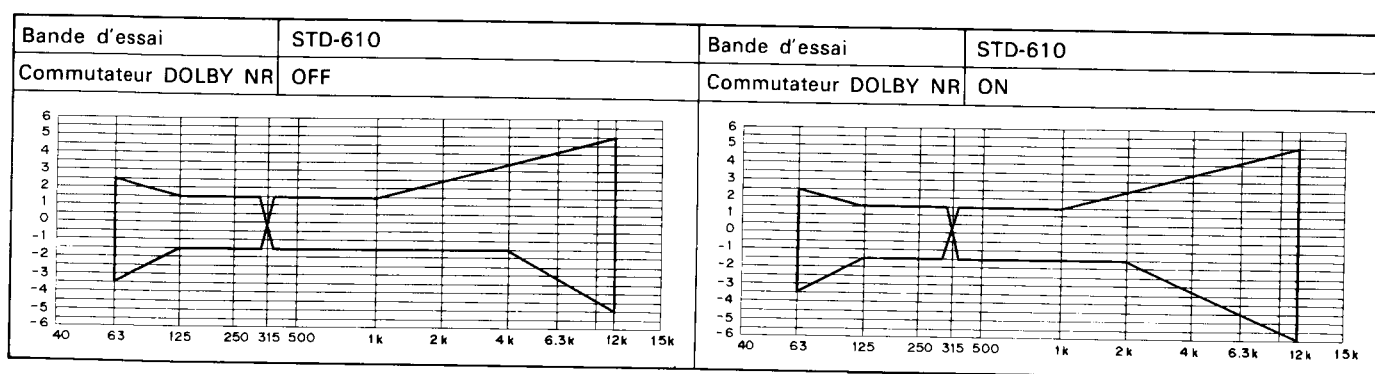


Fig. 12-9 Zone de tolérance de la réponse de fréquence d'enregistrement et de lecture (METAL)

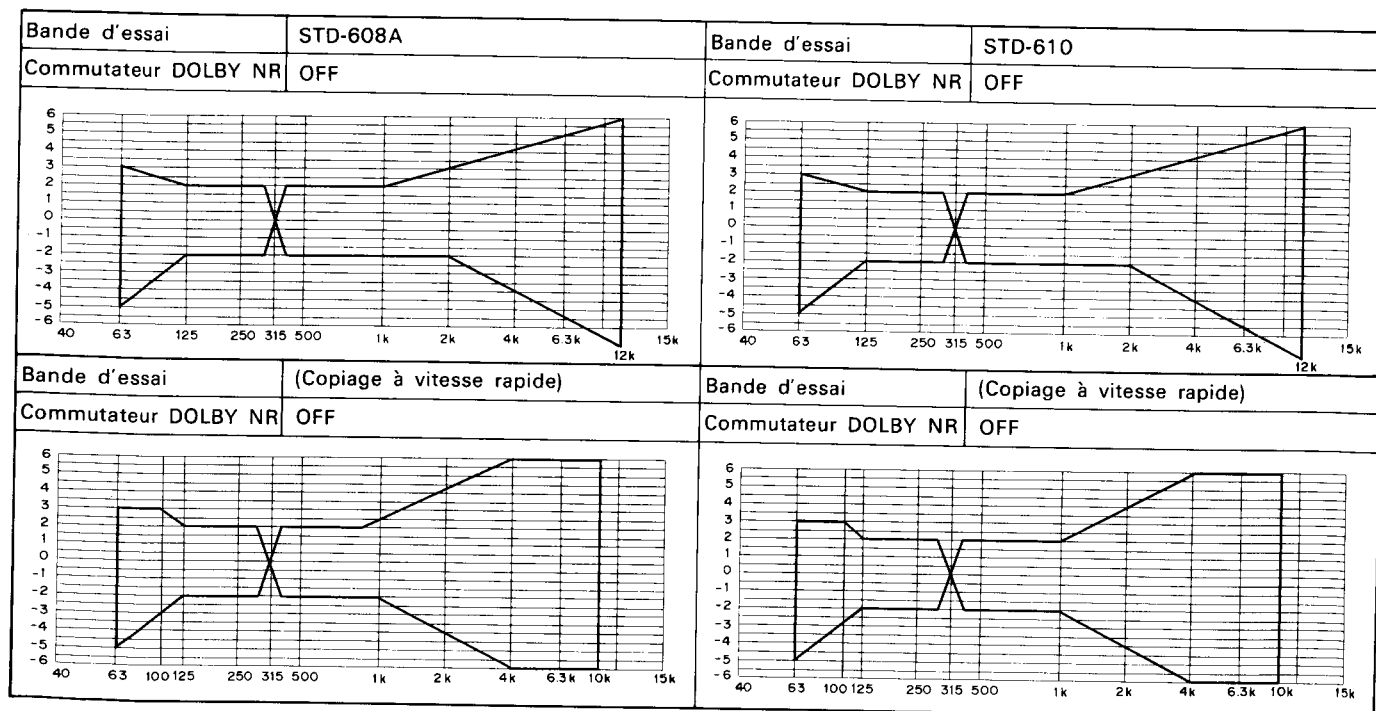


Fig. 12-10 Réponse de fréquence d'enregistrement et de lecture du mode de copiage (à des fins de référence)

12. AJUSTE

12-1. AJUSTES MECANICOS

Antes del ajuste

Limpie ambas bases del carrete, el cabrestante y el rodillo de prensado con una escobillón humedecido en alcohol.

Ajuste de la presión del rodillo de prensado

1. Ponga el magnetofono en el modo de reproducción.
2. Suavemente empuje en contra del brazo del rodillo de prensado con el indicador de tensión y separe el rodillo de prensado ligeramente del cabrestante.
3. Luego ponga de nuevo el rodillo de prensado en el cabrestante, y lea la lectura cuando el rodillo de prensado empiece a girar. Si la lectura no está dentro de 300 a 500g, cambie el resorte de presión del rodillo de prensado.

Inspección del par de torsión de la base de carrete

Mida el par de torsión con un medidor de par de torsión durante la reproducción, en los modos de avance rapido (FF) y rebobinado (REW). Los valores medidos deberan normalmente estar dentro de los rangos permitidos enlistados en la table 1.

Si los valores medidos están fuera de los rangos pertinentes, cambie el conjunto del carrete T, y/o el conjunto del carrete S o el conjunto de la rueda loca P.

Table 1

	Base del carrete T (lado R)	Base del carrete S (lado L)
Mode PLAY	35g·cm—70g·cm	*1g·cm—5g·cm
Mode FF	70g·cm—140g·cm	*1g·cm—5g·cm
Mode REW	*1g·cm—5g·cm	70g·cm—140g·cm

* Par de contra tensión

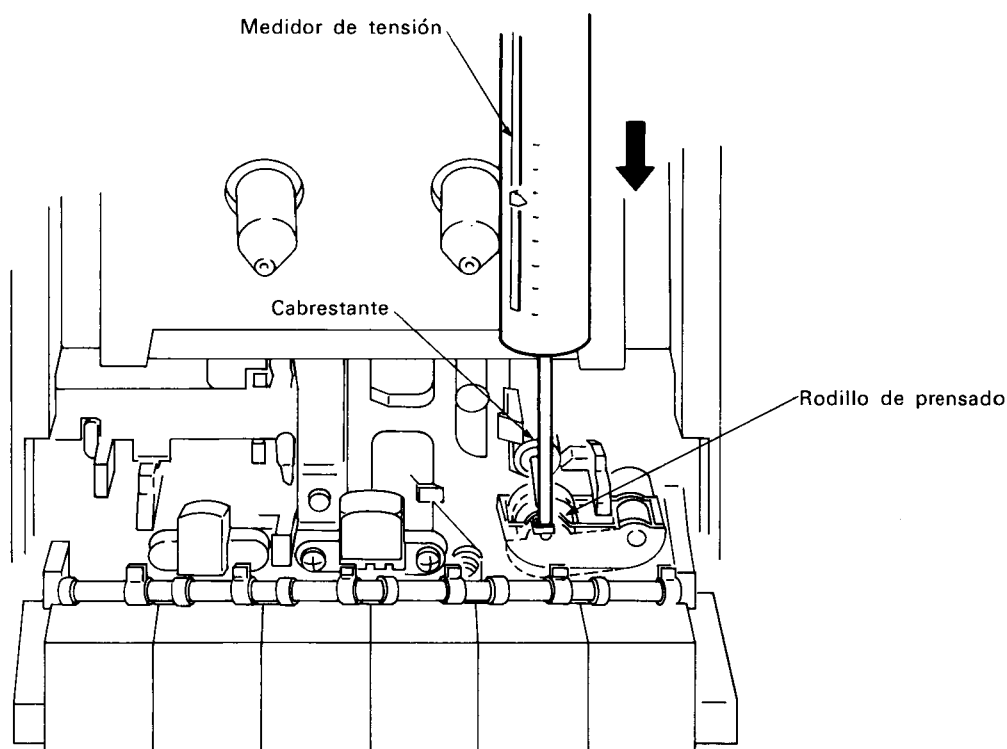


Fig. 12-1 Ajuste de la presión del rodillo de prensado

Ajuste de la velocidad de cinta

1. Conecte el frecuencímetro a la terminal TP1 en el conjunto compuesto.
2. Fije el interruptor de TAPE a la posición ON.
3. Introduzca la cinta de prueba STD-301 en el magnetofono I.
4. Ponga en cortocircuito la terminal TP3 (X2) en el conjunto compuesto, y reproduzca la cinta de prueba STD-301 a doble velocidad.
5. Inspeccione que la frecuencia de señal de reproducción I del magnetofono sea de $6020 \text{ Hz} \pm 10 \text{ Hz}$. Si la lectura de reproducción está fuera de este rango, ajuste VR803 para obtener $6020 \text{ Hz} \pm 10 \text{ Hz}$.
6. Circuito abierto de la terminal TP3 (X2).
7. Reproduzca la cinta de prueba STD-301, e inspeccione que la frecuencia de señal de reproducción I sea de $3010 \text{ Hz} \pm 5 \text{ Hz}$.
Si la lectura de la frecuencia está fuera de este rango, ajuste VR804 para obtener $3010 \text{ Hz} \pm 5 \text{ Hz}$.
8. Cargue la cinta de prueba STD-301 en el magnetofono II.
9. Ponga en cortocircuito la terminal TP3 (X2), y reproduzca la cinta de prueba STD-301 a doble velocidad.
10. Ajuste VR801 para obtener una lectura de frecuencia de reproducción de velocidad doble dentro de $\pm 20 \text{ Hz}$, de la lectura del magnetofono I.

11. Circuito abierto de la terminal TP3 (X2), y reproduzca la cinta de prueba STD-301.
12. Ajuste VR802 para obtener la lectura de frecuencia de reproducción dentro de $\pm 10 \text{ Hz}$ de la lectura del magnetofono I.

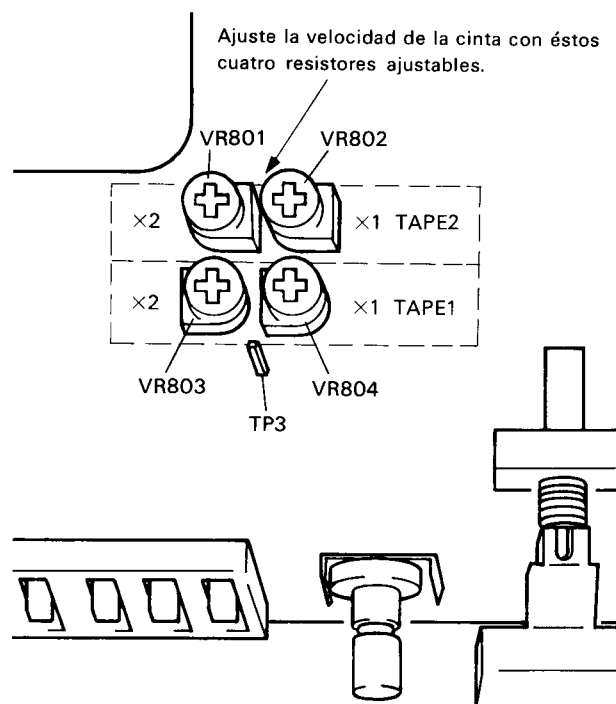


Fig. 12-2 Diagrama de disposición de las partes de ajuste

Inspección de la unión REC

1. Inspeccione que el interruptor deslizable este cambiado completamente cuando la unidad 2 de transporte (magnetofono II) de la cinta está en el modo de grabación.
2. Mueva la posición de trabado del mecanismo de unión REC si el interruptor deslizable no esta completamente cambiado.

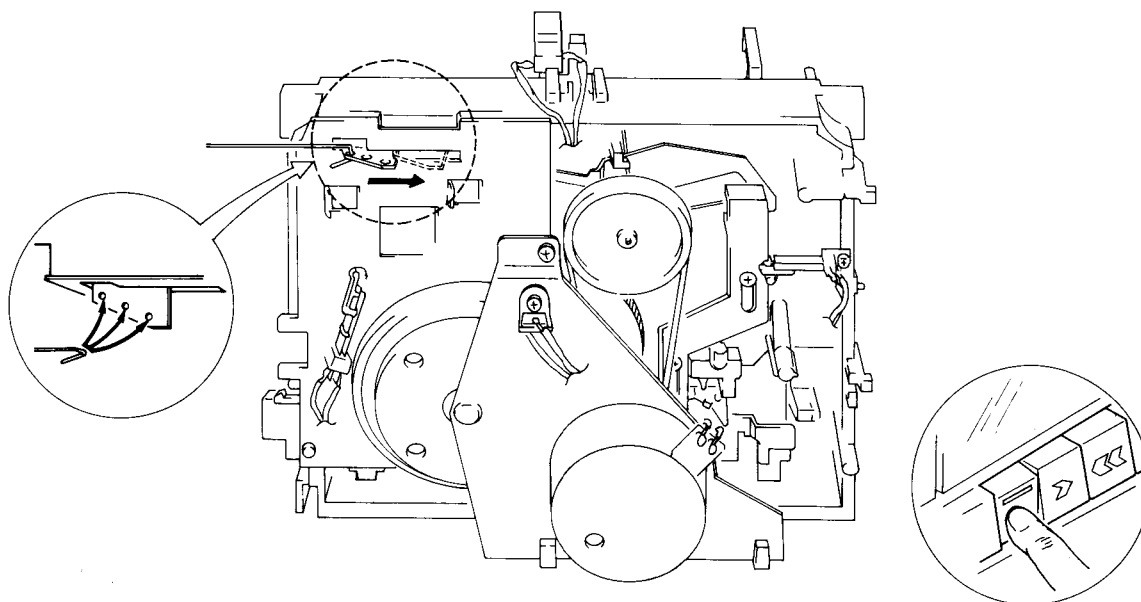


Fig. 12-3 Ajuste de la unión de REC

12-2. AJUSTES ELECTRICOS

■ **Antes de iniciar cualquier ajuste, cerciorarse de haber completado y comprobado lo siguiente.**

1. Deben haberse completo todos los ajustes mecánicos.
2. Las cabezas deben estar limpias y desmagnetizadas.
3. 0 dB=1V durante las mediciones del nivel.
4. Emplear las cintas especificadas para cada ajuste. Aunque estas cintas están provistas de ambos lados, A y B, emplear sólo el lado A, donde está la etiqueta.
 STD-331B: Ajuste de reproducción.
 STD-608A: Cinta en blanco NORMAL.
 STD-603: Cinta en blanco de CrO₂.
 STD-610: Cinta en blanco de METAL.
5. Preparar el siguiente equipo de medición: Un volímetro de CA, un generador de sonido, un atenuador y un osciloscopio.
6. Ajustar los canales izquierdo y derecho a menos que se especifique lo contrario.
7. Y a menos que se diga lo contrario, dejar el interruptor DOLBY NR en la posición OFF.
8. Dejar que se precaliente el aparato durante algunos minutos antes de iniciar los ajustes.
 Y antes de empezar el ajuste de la respuesta en frecuencia para reproducción y grabación, dejar que se precaliente de tres a cinco minutos.

9. Ajustar siempre el aparato en el orden de ajuste dado. Si se cambia el orden, no son posibles los ajustes adecuados, lo cual puede ocasionar pérdida del rendimiento.

Procedimientos de ajuste

Magnetófono I

1. Ajuste del acimut de la cabeza.
2. Ajuste del nivel de reproducción.

Magnetófono II

1. Ajuste del acimut de la cabeza.
2. Ajuste del nivel de reproducción.
3. Respuesta en frecuencia de grabación/reproducción.
4. Ajuste del nivel de grabación.

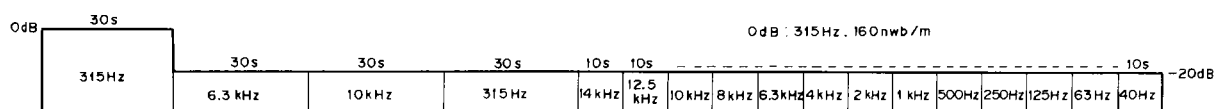


Fig. 12-4. Cinta de prueba STD-331 B

• AJUSTE DEL MAGNETOFONO I (Sin la función del selector automático de cintas)

1. Ajuste del acimut de la cabeza

- Ajustar VR901 y VR902 (Ajuste del nivel de reproducción) a las posiciones MAX (Girados completamente a la derecha)

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	PLAY	Reproducir la parte de 10kHz -20dB de la cinta de prueba STD-331 B.	Tornillo de ajuste del acimut de la cabeza. (Fig. 12-6)	TP1 (L) TP2 (R)	Nivel máximo de señal de reproducción.	Aplicar el "enclavamiento del tornillo" después de finalizar el ajuste.

2. Ajuste del nivel de reproducción

- Ajustar con precisión porque este ajuste establece el nivel del sistema Dolby para reproducción.

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	PLAY	Reproducir la parte de 315Hz 0dB de la cinta de prueba STD-331 B.	VR901 (L) VR902 (R)	TP1 (L) TP2 (R)	-7,7dBv (412mV)	

• AJUSTE DEL MAGNETOFONO II (Con la función del selector automático de cintas)

1. Ajuste del acimut de la cabeza

- Ajustar VR301 y VR302 (Ajuste del nivel de reproducción) a las posiciones MAX (Girados completamente a la derecha)

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	PLAY	Reproducir la parte de 10kHz -20dB de la cinta de prueba STD-331 B.	Tornillo de ajuste del acimut de la cabeza. (Fig. 12-6)	TP1 (L) TP2 (R)	Nivel máximo de la señal de reproducción.	Aplicar el "enclavamiento del tornillo" después de terminar el ajuste.

2. Ajuste del nivel de reproducción

- Ajustar con precisión porque este ajuste establece el nivel del sistema Dolby de reproducción.

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	PLAY	Reproducir la parte de 315Hz 0dBv de la cinta de prueba STD-331 B.	VR301 (L) VR302 (R)	TP1 (L) TP2 (R)	-7,7dBv (412mV)	

3. Ajuste de la respuesta en frecuencia para grabación/reproducción

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	REC	Aplice una señal de 315Hz a las terminales CD/VIDEO. Fije el interruptor de CD/VIDEO a ON.	Nivel de señal de entrada a ser aplicada a las terminales CD/VIDEO.	TP1 (L) TP2 (R)	-27,7dBv (41 mV)	Fije el control de nivel de INPUT (entrada) a la posición máxima (panel trasero).
NORM	REC/PLAY	Grabar las señales de 315Hz y de 6,3kHz en la cinta de prueba STD-608A, y luego reproducirlas.	VR841 (L) VR842 (R)	TP1 (L) TP2 (R)	Repetir los procesos de grabación y reproducción y ajustar consecuentemente hasta que el nivel de reproducción de 6,3kHz esté dentro de $0 \pm 0,5\text{dB}$ del nivel de 315Hz.	

- Cambiar la cinta de prueba y la posición del interruptor DOLBY NR y comprobar que la zona de respuesta en frecuencia indicada en la Fig. 12-8,9 se satisfaga.

4. Ajuste del nivel de grabación

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	REC	Aplice una señal de 315Hz a las terminales CD/VIDEO. Fije el interruptor de CD/VIDEO a ON.	Nivel de señal de entrada a ser aplicada a las terminales CD/VIDEO.	TP1 (L) TP2 (R)	-7,7dBv (412mV)	Fije el control de nivel de INPUT (entrada) a la posición máxima (panel trasero).
NORM	REC/PLAY	Grabar la señal de 315Hz en la cinta de prueba STD-608A y reproducirlas.	VR501 (L) VR502 (R)	TP1 (L) TP2 (R)	Repetir los procesos de grabación y ajustar consecuentemente hasta que se obtenga un nivel de reproducción de -7,7dBV (412mV).	
METAL	REC/PLAY	Grabar la señal de 315Hz en la cinta de prueba STD-610 y reproducirla.		TP1 (L) TP2 (R)	Comprobar que el nivel de reproducción de 315Hz sea de $-7,7\text{dBv} \pm 1,5\text{dB}$.	

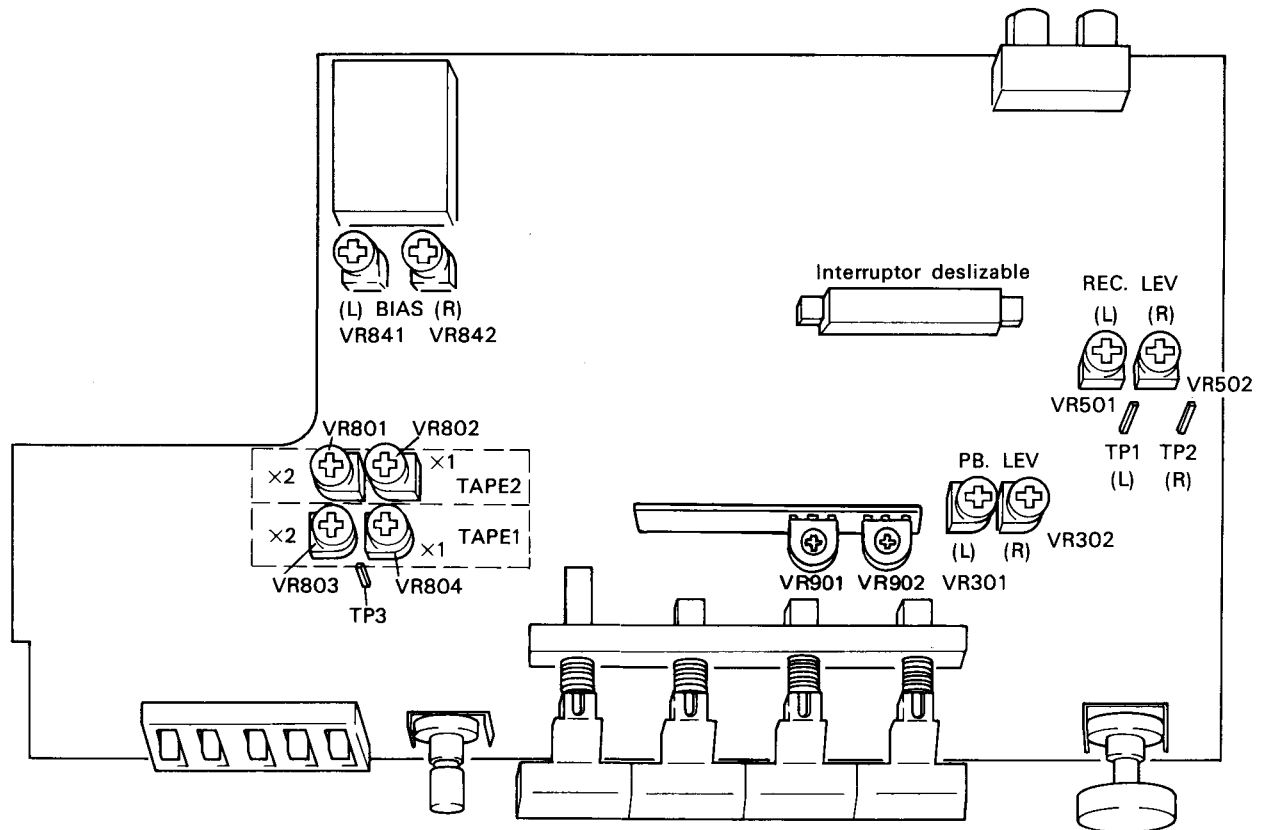


Fig. 12-5 Diagrama de disposición de las partes de ajuste

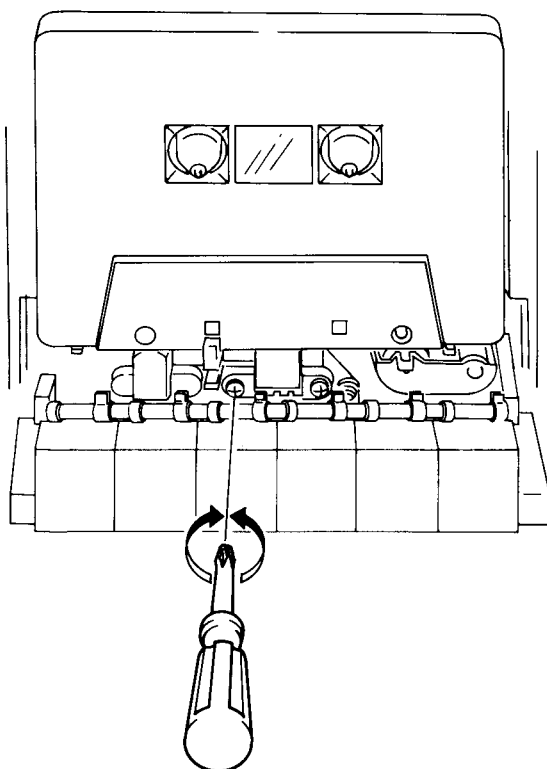


Fig. 12-6 Ajuste del acimut de la cabeza

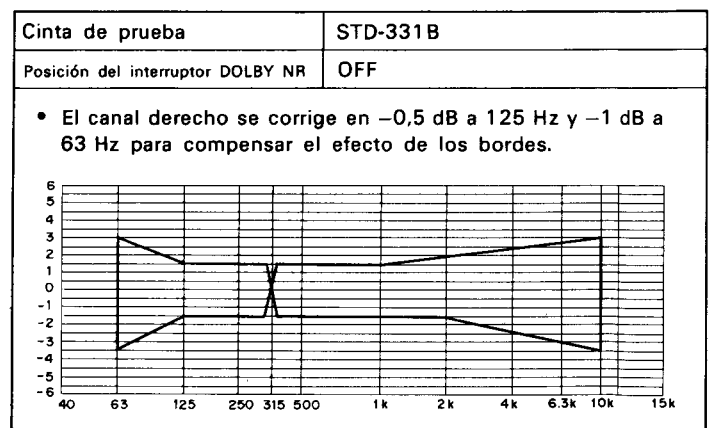


Fig.12-7 Zona de tolerancia de respuesta de frecuencia de reproducción

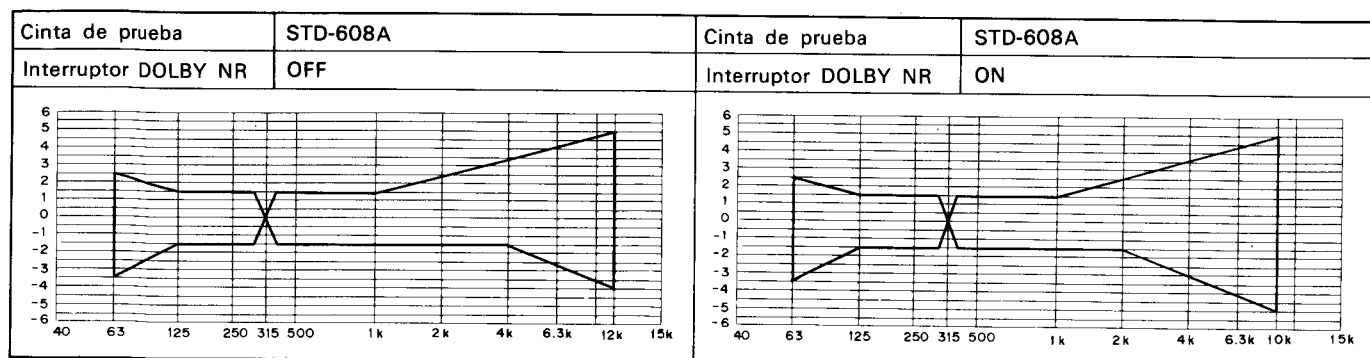


Fig. 12-8 Zona de tolerancia de copia y respuesta de frecuencia de reproducción (NORM)

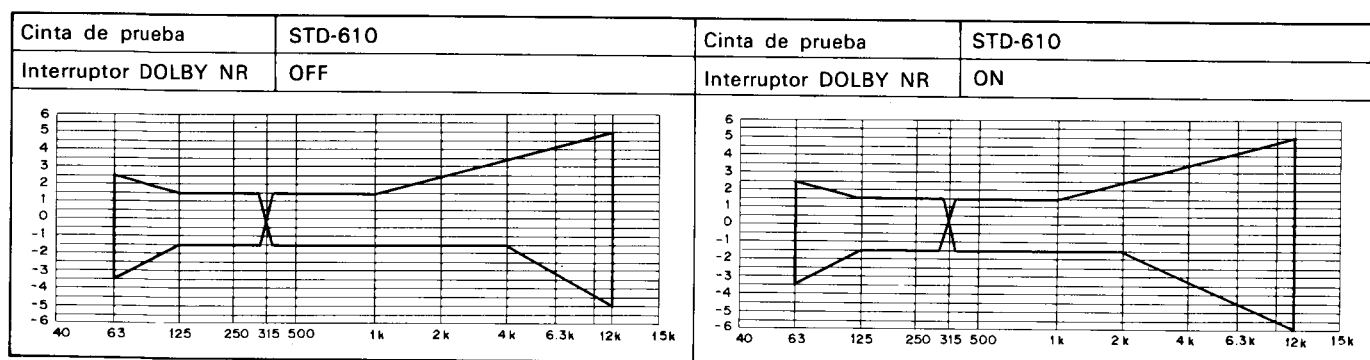


Fig. 12-9 Zona de tolerancia de copia y respuesta de frecuencia de reproducción (METAL)

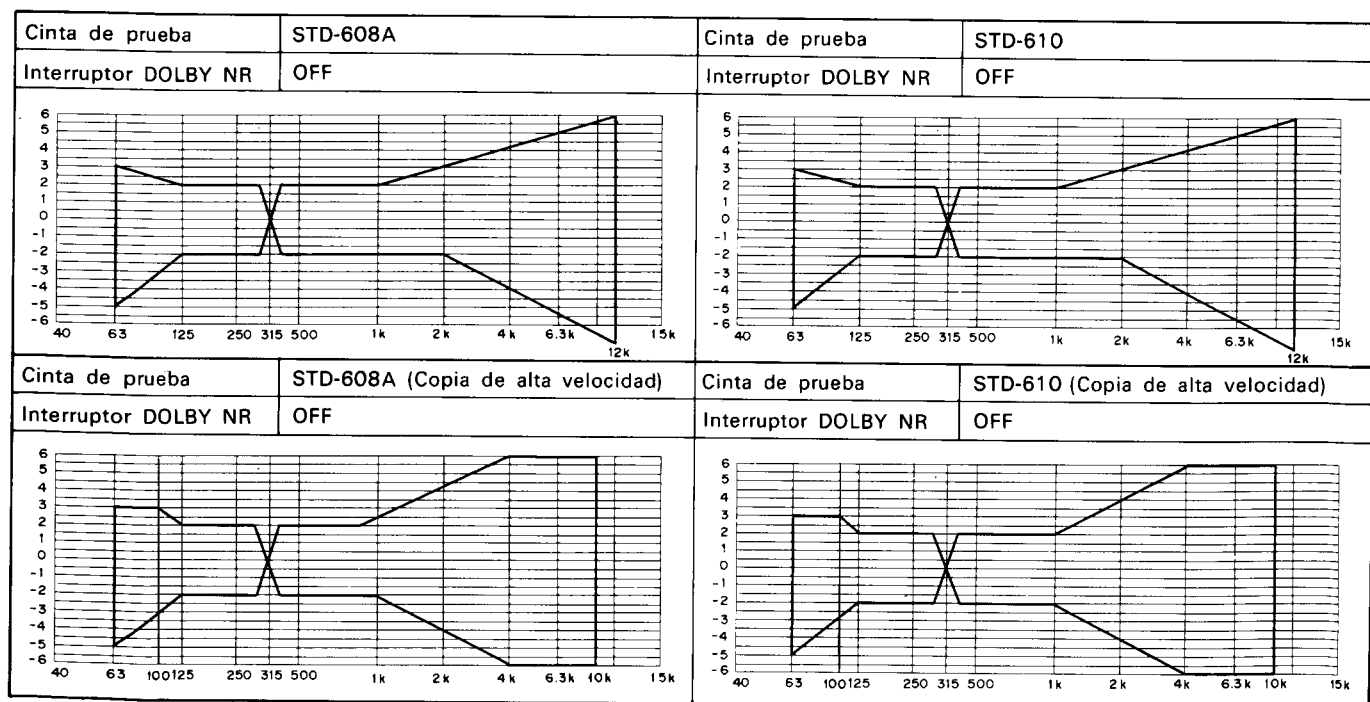


Fig. 12-10 Grabación de modo de copia y respuesta de frecuencia de reproducción (para referencia propuesta)